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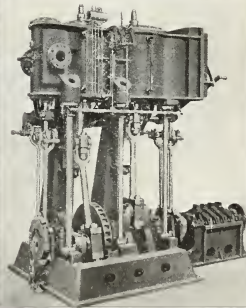
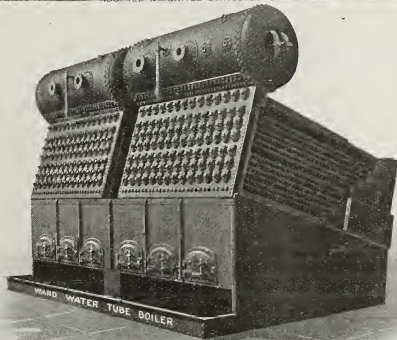
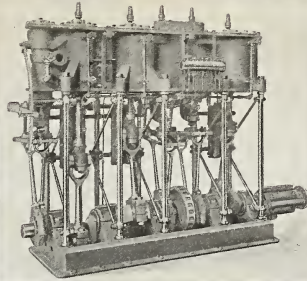
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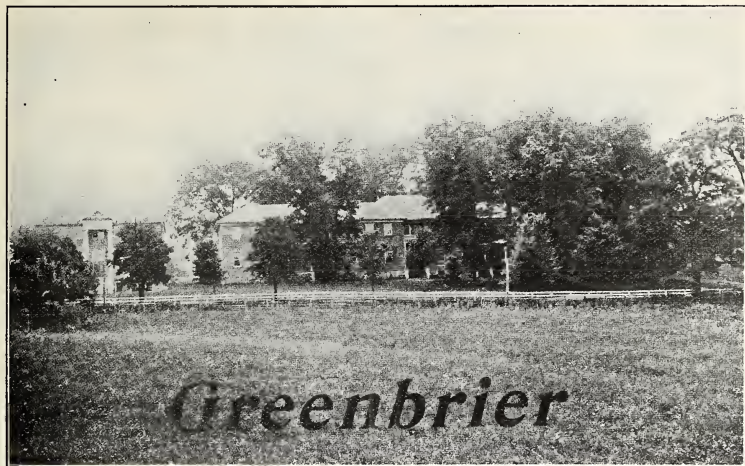
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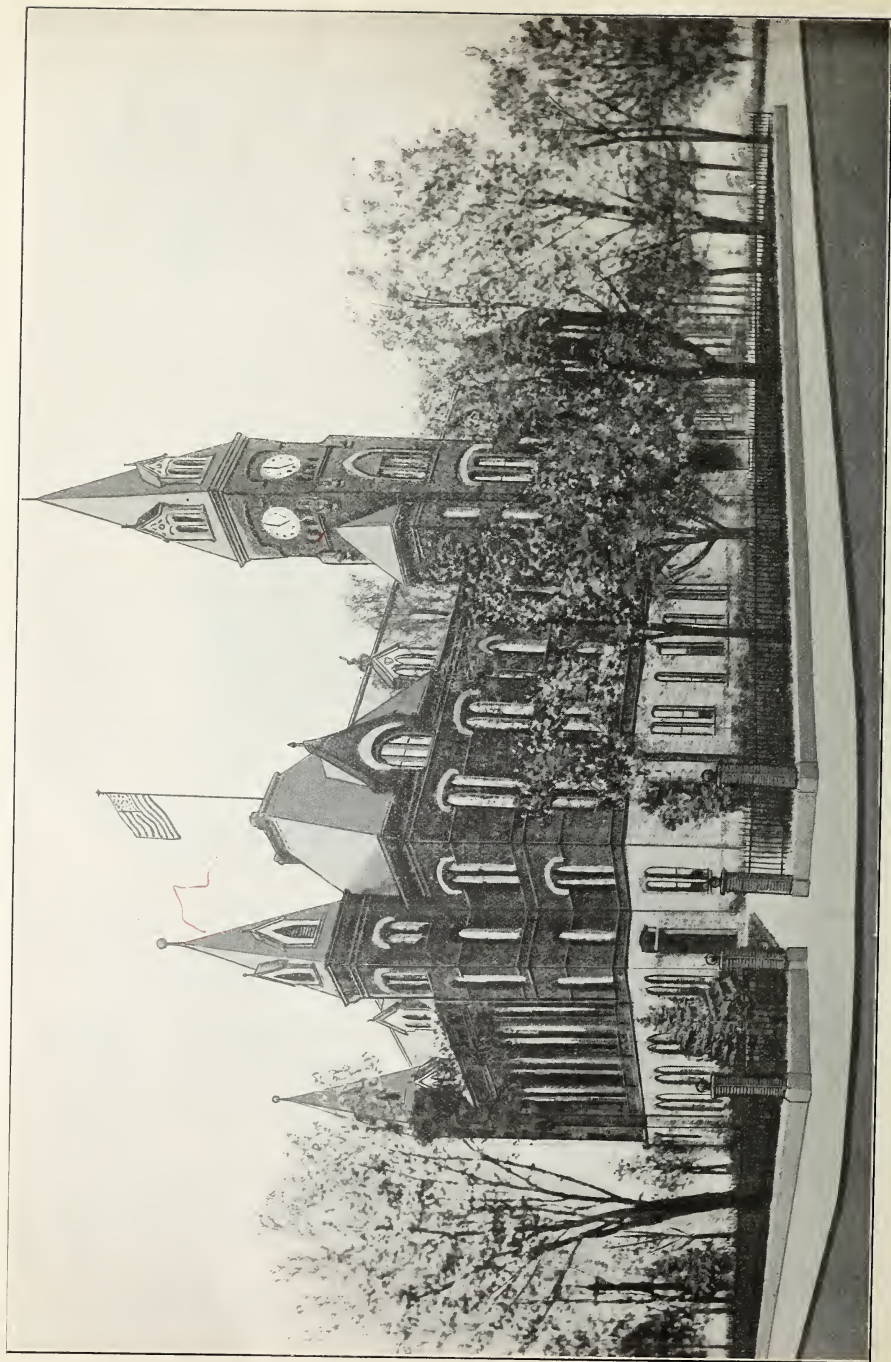
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STATE CAPITOL AT CHARLESTON.

1915 HAND-BOOK OF WEST VIRGINIA



The State's Wonderful Development, Its Natural
Resources and Industrial Advantages



Biographies of Prominent Citizens and Stories
of Leading Business Institutions



GEORGE BYRNE, Editor



COMPILED AND PUBLISHED UNDER THE DIRECTION OF THE WEST
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1915



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FOREWORD



THE story of West Virginia is one of romantic interest. Born to Statehood amid the throes of the civil war, its population small, its people impoverished, its resources unknown, its situation precarious from every standpoint, its progress has been rapid from its natal hour, its growth steady, its prosperity substantial.

Historically it reaches back to a part in the action of Virginia when it was a colony, and to the days of the Revolution, when the courage and devotion of its hardy pioneers helped to write the Old Dominion's story of glory and of blood.

Politically it maintains many of the ideals of the Mother State, modified by the progressive spirit of the newer thought, which has found expression in a more advanced system of taxation, and in general laws which look to the development of the State's material resources and the educational and industrial advancement of its people.

Materially it is one of the richest States in the Union, with immense resources of coal, oil, gas and timber, and agricultural possibilities that have been merely hinted at so far as their development relates to their potentialities.

Commercially it has made rapid progress during the past few years, its territory now being laced by numerous railroads, its streams having been rendered navigable for many miles, its people being industrious, enterprising and progressive.

Geographically its position is unique among the States. It has been said that it is the most northern of Southern States, the most southern of Northern States, the most western of Eastern States, the most eastern of Western States. A glance at the map shows that it reaches as far to the north as Middle Pennsylvania, as far to the south as Middle Kentucky, as far to the west as Middle Ohio, and as far to the east as Middle Maryland.

Topographically it extends from an altitude of 260 feet at Harpers Ferry to almost 5,000 feet at the top of Spruce Knob in Pendleton county.

Climatically its great reach from south to north, together with its approximate mile of difference in altitude, endows it with a variation that is equalled by that of few other States, giving it a crop-range that runs from the cotton of the South to the products of the snowclad fields of Canada.

To tell the story of West Virginia's advantages clearly and succinctly, and to supplement and strengthen it with the history of some of the men and some of the business enterprises that have succeeded within its borders, to the end that the world may be made aware of the opportunities it offers for material advancement, is the purpose of this Hand-Book.

West Virginia, the State of Opportunity.

By George Byrne.

Youngest daughter of the Old Dominion, born amid the throes of the country's greatest political upheaval, West Virginia has come to be known as the Storm-Child of the Civil War. The people of the State are for the greater part descendants of the hardy pioneers who came to settle its valleys, plateaus and mountain sides in the days that intervened between the close of the revolution and the beginning of the unprecedented rush to the vast prairies of the Middle West and the unmeasured reaches of the Far West. The last government census is authority for the statement that the State has a greater percentage of native born population than any other in the Union. It is, therefore, of more homogeneous citizenship than any other, a fact that accounts in some measure for the enterprise of its people that has made its growth one of the wonders of this altogether wonderful country.

To speak the name of West Virginia is to summon to the mind's eye visions of great natural wealth as represented by the possession of vast deposits of coal, oil and gas, iron ore, building stones, limestones, clays, shales, glass sands and cement rock; the extent and utility of its forests; the number of its health-giving mineral springs; the hydro-electric potentiality of its streams; the bracing quality of its atmosphere; the rugged beauty of its scenery—for it is in respect of these that the State has become best known to the world. The riches of West Virginia in these things are indeed beyond the farthest reach of reliable computation, and their utilization during the past few years has brought the State from a position almost negligible to one of prominence in the scale of wealth. Yet these things do not by any means comprise all its potentialities for material progress, for West Virginia has a combination of soil and climate that makes for agricultural possibilities of even greater importance.

West Virginia is situated between 37° 40' and 40° 40' north latitude and its climate in a general way ranges from that of Central Kentucky to that of Central Pennsylvania. But the character of the climate cannot be accurately told in degrees of latitude; its range of altitude must be taken into account also, for this has great influence in the modification of the temperature which prevails within its boundaries. At Harpers Ferry, at the State's extreme eastern edge, the elevation is 260 feet; at the top of Spruce Knob, in Pendleton county, it is 4860 feet. The difference of almost a mile in altitude makes a difference approximately equal to that made by 15 degrees of latitude. This will serve to convey some idea of the wide range of agricultural possibilities presented by the various sections of the State.

There are three well defined geographical divisions of West Virginia—the Ohio river division, the Mountain and the Potomac. The first comprises half the area of the State and more than half its population. It takes in the fertile bottom lands along the Ohio river, the Great Kanawha and numerous smaller streams, and the rolling, hilly country lying between them and the Mountain section. The altitude runs from 500 to 1500 feet. The lands produce prolifically of grains, grasses, fruits, truck and tobacco. The Mountain division extends from the low hills of the eastern border of the Ohio river division to the high plateau lands that top the Allegheny mountains, containing all the eastern half of the State except that known

as the "Eastern Panhandle." The elevation generally runs from 1600 to 3000 feet, though some of the mountain peaks are as high as 4800 feet. Much of this division is still covered with forests, and there are wide areas of fine grazing lands, together with much that is adapted to general agriculture and fruit growing purposes. The Potomac or Eastern Panhandle division is comprised of the counties of Berkeley, Jefferson, Hampshire, Morgan, Hardy, Grant and Mineral. Portions of the four western counties of this group are marked by high ridges, but the valleys are wide, and in climatic as well as topographic conditions the section differs widely from the western portions of the State. It includes in area 2000 square miles and has a population of 125,000. It is a rich limestone farming section and constitutes one of the great fruit belts of the State—a section of highly cultivated fields, of thrifty orchards and comfortable, hospitable homes. The elevation ranges from 260 to 1500 feet.

The soils of West Virginia are of two general classes—alluvial and sedentary. The alluvial soils have been formed in the valleys by the overflow of the streams and the silt from the adjacent hills. They are highly fertile and with good cultivation produce abundant crops. The sedentary soils have been formed by the disintegration of the underlying rocks, and vary in character with the nature of the rocks themselves. They are composed of the various limestones, sandstones and shales, and run from a moderate to a high degree of fertility, but are all easily made productive by proper treatment.

West Virginia is an excellent grazing State, the hill-sides covered with nutritious native grasses and watered by pure mountain streams forming ideal pastures. The mild winters allow grazing throughout nine months of the year, and in the chief cattle-raising counties the herds are carried through the winter on hay alone, the choicest export beef being sent to the market without having been fed a pound of grain. The same conditions that make for success in raising beef offer a profit in dairying, and the local markets of the State are capable of taking up much larger amounts of dairy products than are now produced within its confines. A number of West Virginia counties, notably those of the "Northern Panhandle," are peculiarly adapted to sheep growing, having the Permian limestone soil that produces the finest quality of wool. Corn yields well where properly cultivated, and wheat is profitably grown in many of the counties. In various portions of the State, and especially in the Ohio river bottoms, trucking is carried on with marked success, the soil being well adapted to the production of vegetables of all kinds, and the markets throughout the mining sections and in the various cities and towns being such that good prices are obtained at all times. It will be many years before the local demand is met by local production, and therefore opportunities are many for those desiring to engage in small farming and market gardening.

In most sections of the State, but especially in the Eastern Panhandle, conditions of soil and climate are highly favorable for the growing of fruit, and numerous companies and individuals are engaged in raising apples and peaches on a large scale. Berkeley county leads in the production of apples and Hampshire county in the production of peaches, but the nearby counties are also

large producers of both. These fruits have become very popular in the big markets and always find ready sale at good prices.

In a tier of counties in the southwest portion of the State the growing of tobacco has become a leading industry among agriculturists in the last few years, and the annual product has grown to many millions of pounds. The sales in Huntington alone aggregate more than ten million pounds yearly, and there are other markets of greater or less extent throughout the tobacco-growing section.

The land area of West Virginia is 24,022 square miles, or 15,374,080 acres. Of this there is a very large amount still in virgin forest, while the coal area of the State is estimated by some to reach 17,000 square miles, equal to the combined coal area of Europe, excluding Russia. It is estimated that this area originally contained 150,000,000,000 tons of coal of which a comparatively infinitesimal amount has so far been mined. The output for the past year was 70,000,000 tons, and at that rate it will take more than 2,300 years to exhaust the supply. The coal is bituminous, with here and there considerable pockets of cannel coal. The product of some sections is of great value for coke making purposes, while in other sections it contains so high a percentage of volatile matter as to be ideal for the manufacture of gas. All these coals are of excellent value for domestic purposes, and some of them excel any other coal in the world, with the possible exception of that found in Wales, in the matter of steam-producing potentiality. Though West Virginia is now mining fifty per cent. more bituminous coal than was mined in the whole of the United States in 1880, the coal producing industry is still at the beginning of its development.

The first successful drilling for oil was at Burning Springs, in Wirt county, in 1860. The wells then put down were in the shallow sands and, though some of them were fairly good producers, were short lived. For the past twenty years or more drills have been sent into the deeper sands, and wells of much greater production and much longer life have been struck in various fields. In amount of production the State stands fifth, in value of product fourth.

Early in the last century salt makers of the Great Kanawha valley in putting down wells for salt water struck pockets of natural gas, and finally one of them piped it to his furnace and there used it as a fuel for evaporating the water and securing the salt from the brine. That was the first use made of natural gas so far as history has recorded. With the drilling of oil wells the use of gas where found became common, and finally gas production became a business apart from the production of oil, and is now carried on very extensively throughout the State. In the production of gas West Virginia stands first, with an annual output running to billions of cubic feet. A very large portion of this is piped outside the State and used for lighting, power and fuel elsewhere. Many cities and towns in the State, however, use it for lighting, for the development of power and as fuel for domestic and manufacturing purposes. It is notably so used in Wheeling, Wellsburg, Sistersville, Morgantown, Fairmont, Clarksburg, Grafton, Parkersburg, Huntington and Charleston. It is so convenient as a fuel that where obtainable at reasonable prices it has almost altogether supplanted coal. Vigorous efforts are being made to develop manufactures using gas as fuel, in order that the potential wealth of this resource may be made to enrich West Virginia instead

of other States. By reason of the abundance and cheapness of its gas, the variety and extent of its raw materials for manufactures and the exceptional strategic location of the State as relates to the great consuming markets of the country, it is altogether probable that there will be in the near future a very rapid growth of industrial interests.

The Oriskany and Clinton iron ores are found extending almost entirely across the counties of Hampshire, Hardy and Pendleton, and to some extent in Mineral, Morgan and Grant. They run from 35 to 60 per cent. metallic iron, and must come into extensive use as the demand for iron and steel increases with the growth in population and the development of the country.

The Oriskany and Medina white sandstones, which furnish a high quality of glass sand, extend for many miles through Morgan and adjoining counties. They are now being largely used from quarries adjoining the old town of Berkeley Springs, and will unquestionably be much more extensively used in the near future, as they make glass of the finest quality. Deposits of glass sand of high quality are also found in numerous other localities throughout the State.

Limestones are found in many counties, some of them being of the highest degree of quality. Developments have been made in numerous places, the largest being in Berkeley county, about Martinsburg. The deposits there are of such a degree of purity that they are much used as flux for iron ore in the furnaces of Pittsburg and elsewhere. Quarries located about Martinsburg are also taking out large quantities of the stone for use in making lime and cement, and likewise for road construction. A big modern plant for the manufacture of hydrated lime is located there, and one of the most modern plants in America for quarrying limestone has recently been completed.

Together with these vast deposits of limestone the State has excellent clays and shales, thus furnishing the complete tale of ingredients for making Portland cement. These are found in many sections of the State.

Excellent clays for pottery, brick and general refractory purposes are found in various sections of West Virginia, and brick and tile are made in numerous localities. There are large potteries in the Northern Panhandle and smaller ones in other sections. Considerable quantities of sewer-pipe are made in the State also. The increase in the amount of pottery produced has been very rapid in the last few years, since the development of the natural gas fields. Glass making has also become an important industry, following the increased production of natural gas, and many factories are located at various places through the gas-producing territory.

West Virginia has building stones of many kinds, equal in quality, color and durability to the best found elsewhere. As yet, however, little has been done to develop them, though some of the handsomest buildings recently erected in New York City are constructed of West Virginia stone.

Strong salt brine lies under the ground in numerous places throughout the State, and salt making was formerly carried on quite extensively, especially in the Great Kanawha Valley. All but two or three of these salt furnaces have been forced out of business by one cause or another, and salt making has sunk to almost insignificant proportions. The brine is still here, however, and the time will doubtless come when the once prosperous business of salt making will be taken up again.

With its mountainous topography and never-failing streams, West Virginia presents many opportunities for the development of water-power. There are few such developments as yet, though several of large importance are in contemplation. Notwithstanding the abundance of coal and gas it is believed that the vast power sites on its rivers will ultimately be fully utilized, and the State will be covered by a network of wires carrying the electric current to every city within its borders and many without.

Six railway trunk lines enter West Virginia—the Baltimore & Ohio, the Chesapeake & Ohio, the Norfolk & Western, the Virginian, the Western Maryland and the New York Central. Three of these—the Baltimore & Ohio, the Chesapeake & Ohio and the Norfolk & Western,—cross the State from east to west, and with their branches radiate through it in many directions. The Virginian, the Western Maryland, the New York Central and the Kanawha & Michigan penetrate some of the State's best coal territory, and find an abundance of traffic in the output of the mines. In addition to these there are half a hundred local roads, the whole forming a network of transportation lines that put practically every section of the State in intimate touch with the largest centers of population and commerce in this country, and, through their ocean connections, with all the world's important ports. The Ohio, the Great Kanawha, the Little Kanawha, the Monongahela and the Big Sandy are navigable streams, thus completing facilities for transportation not frequently equalled.

West Virginia has an up-to-date system of public schools, upon which it spends more than \$4,000,000 annually. It is one of the few States in which the law requires agriculture

to be taught in the common schools. The public school system embraces six normal schools for the training of teachers and a university of high standing, supplemented by a number of other institutions of college rank.

The State has many manufacturing establishments of great importance, including the largest pottery, the largest drug and extract factory and the largest stogie factory in the United States; the largest axe factory and the largest independent tin-plate mill in the world.

It has many mineral springs of great medicinal value, and scores of summer resorts in the mountains, to which health and pleasure seekers come from all over the world.

The progress already made by West Virginia is indicative of what will be seen in the future. In 1880 the combined output of the factories, farms, forests and mines of the State aggregate less than \$50,000,000. Last year the value of the mineral output alone more than doubled that amount, the value of the agricultural products more than doubled it, and the value of the factory products of the State was more than four times as great. This is a record of progress hard to match, but the immediate future promises to far surpass these totals, though the percentage of increase will doubtless decline as the figures grow in magnitude.

Owing to its varied character of soil and climate, its resources of raw material, its possession of vast supplies of cheap fuel,—coal, oil and gas,—its tremendous potentialities of hydro-electric power, and its excellent transportation facilities, West Virginia offers innumerable opportunities to the manufacturer, the farmer, the stock grower, the fruit grower, the artisan, the merchant and the investor. It is a State of almost limitless resources in the infancy of their development and utilization.

The State's Boundary and Topography.

The territory of the State of West Virginia has never been fixed officially by metes and bounds, but in a general way the State may be bounded thus: Beginning at a point on the summit of the Blue Ridge about a half-mile east of Harpers Ferry, where the Potomac river breaks through that mountain range, and running with the Potomac to the confluence of its North and South Branches; thence with the meanderings of the North Branch to its source or first fountain; thence with the meridian line passing through said fountain due north with the western boundary of Maryland to the southern boundary of Pennsylvania; thence due west to the southern corner of the latter state; thence due north with the western boundary of Pennsylvania to low water mark on the north bank of the Ohio river; thence with the low-water mark along the northwest bank of said river in a south-westerly direction to the mouth of the Big Sandy river; thence in a south-easterly direction with the meanderings of said big Sandy river and Tug Fork thereof to Wharncliffe, a corner of Virginia and Kentucky, one-half mile from the mouth of Knox creek; thence with the line of and including the counties of McDowell and Mercer, along the crest of Dividing Ridge and Big Stone Ridge, and in a southeasterly direction across the Blue Stone valley to Fast River mountain; thence with the crest thereof to New River; thence with the crest of Peters Mountain around the source of Big Stony creek to Potts mountain; thence with the crest of same and southwesterly across the valley of Dunlaps creek to the Allegheny mountains; thence with the sum-

mit of same to Haystack Knob, a corner of Virginia on the line of Pocahontas county, at the sources of the Cheat, the Greenbrier and the South Branch rivers; thence southeasterly with the southern line of Pendleton county, across the North Fork mountain and Jackson mountain to the summit of the Shenandoah mountain; thence with said mountain to the source of Lost river; thence southeasterly to Great North mountain; thence with its crest and Cacapon mountain to a corner of Virginia on the southern line of Morgan county; thence southeasterly with the line of and including Morgan, Berkeley and Jefferson counties, across the Shenandoah Valley to the summit of Blue Ridge; thence with the crest thereof to the place of beginning.

The State's Long Reach.

Harpers Ferry, most easterly of the towns of the State, is but sixty miles from Washington and tidewater on the Potomac, while Kenova, at the mouth of the Big Sandy, the State's most westerly point, is almost due south of Columbus, Ohio. The north line of Hancock county, the northern extremity of the State, is many miles north of Pittsburg, while its southern extremity on Dividing Ridge, 245 miles south, is due east from Paducah, Kentucky. Morgan, Hardy, Hampshire, Mineral, Grant, Pendleton, Berkeley and Jefferson counties are drained by streams that flow into the Potomac and thence reach the Atlantic through Chesapeake Bay, while practically all the rest of the State's territory is drained by streams flowing into

the Ohio river, which washes its western shores for 256 miles, and thence by way of the Mississippi into the Gulf of Mexico. Morgan, Berkeley and Jefferson counties, with 856 square miles of territory—547,840 acres—form what is known as the "Eastern Panhandle," and Hancock, Brooke, Ohio and Marshall, running northward between Ohio and Pennsylvania, with an area of 540 square miles—345,600 acres—constitute what is known as the "Northern Panhandle." From these two divisions West Virginia takes its well known pseudonym, the "Panhandle State."

West Virginia's total area is 24,580 square miles, or 15,731,200 acres of land—valley, hill table-land and mountain,—and 135 square miles of water surface. This area is more than twice that of Maryland, three times that of Massachusetts, five times that of Connecticut, twelve times that of Delaware, and twenty times that of Rhode Island. The State is twice as large as Belgium, twice as large as Holland, a third larger than Denmark and more than a third larger than Switzerland.

Topography.

West Virginia is composed of four distinct regions: 1. The Ohio Valley region; 2. The Cumberland Plateau; 3. The Allegheny Highland; 4. The Potomac Region. The surface of that portion of the State comprising the first three divisions resembles a vast inclined plane of irregular surface, sloping from the top of the Allegheny range, some peaks of which reach an altitude of 5,000 feet, westward to the Ohio river. Three lines drawn, one from the summit of the Allegheny mountains at the eastern edge of Pocahontas county to the Ohio river at the mouth of the Little Kanawha, another from the crest of Potts mountain to the Ohio at the mouth of the Great Kanawha, and the third from the top of East mountain at the eastern boundary of Mercer county to the Ohio at the mouth of the Big Sandy, will be found to be practically of the same length, about 150 miles. Following these lines eastward from the Ohio river, the traveller will ascend a general slope which is divided into three different and widely extended benches or terraces, each of which forms a distinct division of the State's topography. The first of these is a lowland section, or the Ohio Valley region; the second is a sub-mountain highland, which is known as the Cumberland Plateau; the third is the mountain region, known as the Allegheny Highland.

The Ohio Valley Region.

That division known as the Ohio Valley region reaches along the northwestern portion of the State from the mouth of the Big Sandy to the extremity of the Northern Panhandle. Its western boundary is the Ohio river, its eastern the line that defines the division between the valley section and the plateau elevation. Within the Ohio Valley region lie the counties of Hancock, Brooke, Marion, Wetzel, Tyler, Pleasants, Wood, Jackson, Cabell, Wayne, Lincoln, Putnam, Roane, Calhoun, Wirt, Ritchie and Doddridge, with portions of Monongalia, Marion, Harrison, Gilmer, Braxton, Clay, Kanawha, Boone, Mingo and McDowell. The total area of this region is 8,326 square miles, or 5,327,640 acres. The streams here flow down to the Ohio, through a succession of hills, for this entire region is one of hills. Nowhere in it is there a spot entirely out of sight of hills, for they occupy the greater part of its surface. About 30 per cent. of the State at large is composed of alluvial or bottom lands, but the proportion of that character of land is much larger in this region. Along the western edge of the State, which borders on the Ohio

river for 256 miles, there is a succession of wide bottoms, alternating with but few narrows, while the valleys of the Big Sandy, the Guyandotte, the Great Kanawha, the Little Kanawha and the Monongahela add largely to the total of the State's bottom lands. This total is augmented again by the valleys of the many streams that range next in importance, swelling the whole to the given total of 30 per cent. of the entire area. The soil of this region is largely alluvial, composed of the washings from the surrounding hills, rich, fertile and naturally readily amenable to cultivation.

As much of the comparative value of the soils of a State depends upon its altitude, by which its temperature, moisture and vegetable life are modified, the character of the region under consideration can be gathered from a study of its elevation above sea level. The elevation at the mouth of the Big Sandy is 550 feet; that at the town of Dingess, in Mingo county, is 1,001 feet. Between these two extremes lie Point Pleasant at the mouth of the Great Kanawha, at 565 feet; Winfield, Putnam county, 583 feet; Ripley, Jackson county, 599 feet; Charleston Kanawha county, 603 feet; Parkersburg, Wood county, 624 feet; Wheeling, Ohio county, 647 feet; Grantsville, Calhoun county, 657 feet; Kanawha Falls, Fayette county, 659 feet; Spencer, Roane county, 710 feet; West Union, Doddridge county, 809 feet; Morgantown, Monongalia county, 816 feet; Sutton, Braxton county, 842 feet; Bethany, Brooke county, 931 feet; Mannington, Marion county, 969 feet; Grafton, Taylor county, 1,000 feet.

The hills in this region rise from 200 to 500 feet above the general surrounding level, the highest points being Bald Knob in Boone county, with an elevation of 1,101 feet above sea level; Mann Knob in Wayne county, 1,437 feet; Powell Knob in Gilmer county, 1,460 feet; Bragg Knob in Clay county, 1,674 feet; High Knob in Braxton county, 1,720 feet.

In the Ohio Valley region are the cities of Wheeling, Grafton, Parkersburg, Morgantown, Charleston and Huntington, and in it about half of the State's population is found.

The Cumberland Plateau.

The Cumberland Plateau takes its name from the fact that the area of which it is formed is a continuation of the table land from which rise the Cumberland mountains. This division of West Virginia reaches across the State from Kentucky to Pennsylvania, with a general elevation of from 1,000 to 2,000 feet. Its northwestern boundary is the Ohio Valley region, and on the southeast it impinges upon the Allegheny Highlands, which name is given that portion of the State which rises above the general 2,000 foot elevation. This plateau region embraces the counties of Preston, Taylor, Barbour, Upshur, Lewis, Nicholas, Fayette, and portions of Wyoming, Mingo, Logan, Kanawha, Gilmer, Harrison, Braxton, Boone, Raleigh, Summers and Webster. It has an area of 6,700 square miles, or 4,290,000 acres. Approaching this region from the west the traveller observes a more rapid current in the streams, and meets with such falls as those on the Coal, the Great Kanawha and the Tygarts Valley rivers, with rapids such as the "Roughs of Tug," and others where the water leaps with swiftness from the higher levels of the plateau to the lower lands of the valley region. Here, also, the hills will be found to have noticeably gained in height, standing from 100 to 1,000 feet above the river beds, while the valleys in many instances assume the form of narrow canons, with high, steep edges,

sometimes rising for hundreds of feet sheer from the water's edge. Through these narrow passage ways, cut by centuries of running water, the streams rush with the force and swiftness that come from a descent of several feet to the mile. At the mouth of the Greenbrier the elevation is 1,372 feet, at Kanawha Falls, it is 669 feet—a descent of 703 feet in 60 miles, or an average fall of $11\frac{1}{2}$ feet to the mile. The city of Elkins sits at an elevation of 1,920 feet above sea level, while Grafton, 58 miles away, has an elevation of 1,000 feet. Down this descent of 920 feet the Tygarts Valley river rushes with the momentum given by a fall of 16 feet to the mile. At Iaeger on the Tug river the elevation is 978 feet, while at Kniss on the Elkhorn, principal tributary of the Tug, the elevation is 1,995 feet. The difference in altitude is 1,017 feet, and the distance between the two points but 40 miles, therefore the water that runs from the one to the other rushes along with the velocity gained from an average fall of $25\frac{1}{2}$ feet to the mile. In a few places on the eastern edge of the plateau the waters gather in wide, deep basins, as seen in the New River above Hinton, in the Tygarts Valley river at Philippi, and other places on various other streams, but all these comparatively level stretches are compensated by the greater fall in the rapids below.

From the Allegheny mountain range numerous spurs with mountain elevation reach out over this plateau. Among these are Dividing ridge, in McDowell county; Macajah ridge, Huffs mountain, Milam ridge, and Guyandotte mountain, in Wyoming county; Pond mountain and Coal River mountains in Boone and Raleigh counties; Big Sewell, Gauley and Cotton mountains and Dogwood ridge in Fayette county; Powell mountain in Nicholas county; Williams river, Back Fork, Elm and Elk mountains in Webster county; Brier mountain and Laurel Hill in Preston county. These with others form the secondary ranges of the State and rise from 1,000 to 2,500 feet above sea level.

The altitudes of the various towns lying on the plateau are as follows: Dingess, Mingo county, 1,001 feet; Clarksburg, Harrison county, 1,007 feet; Weston, Lewis county, 1,017 feet; Glovers Gap, Marion county, 1,039 feet; Carnifex Ferry, Nicholas county, 1,208 feet; Pineville, Wyoming county, 1,275 feet; Welch, McDowell county, 1,297 feet; Buckhannon, Upshur county, 1,401 feet; Roncoveerte, Greenbrier county, 1,663 feet; McDonald, Fayette county, 1,678 feet; Belington, Barbour county, 1,697 feet; Tunnelton, Preston county, 1,825 feet; Elkhorn, McDowell county, 1,882 feet; Hardwood, Webster county, 1,912 feet; Montrose, Randolph county, 1,919 feet. These figures are the railroad levels, and around and about all the places named rise hills and mountain peaks to a much greater height.

The soil of the plateau lands is generally representative of the rocks that prevail upon it, with a strong admixture of the slates brought from the mountain sides by the wash of the waters flowing down through the ages, and accumulated for the greater part before the growth of the forests upon it. Toward the higher reaches of the eastern portion of the plateau the soil is less mixed in substance, and the timber less varied. Where the ridge tops are sharp and narrow the rock is found within a short distance of the surface, and in fact often protrudes, bare and uninviting, above the surface; but when the ground is flat, or but slightly inclined, as is largely the case, the soil is deep and arable, heavily topped with humus, and produces for the most part the same timber and the same crops as those of the valley region. There

are many fine farms and beautiful homesteads on this plateau, upon which reside more than 300,000 of the State's people.

The Allegheny Highlands.

Beginning with the eastern boundary of the plateau lands which have just been considered, the topography of the country changes into a more elevated character than that of the sections already described, and we have the Allegheny Highland, so-called from the name of its predominating mountain range. On the Allegheny Highland lie the counties of Hardy, Grant, Pendleton, Randolph, Tucker, Greenbrier, Pocahontas, Monroe and Mercer, with portions of McDowell, Wyoming, Summers, Fayette, Webster, Raleigh and Preston. Here the canon features of the plateau have disappeared, the towering precipices and swiftly rushing waters have been left behind, and the general topography is marked by the long, regular, symmetrical parallel folds of the Allegheny mountains. Here the perpendicular walls rising from the rivers, and the mountain peaks towering far above surrounding objects are entirely wanting, and while mountain rises on mountain throughout the landscape, the crests are less sharp and the sides less abrupt. Stretching away to the southwest is the lofty Allegheny crest which, with its southwest continuations—Potts mountain and East mountain—forms the dividing ridge between the two Virginias. Of its parallel and outlying ranges are the New Creek mountains, in Grant county; South Branch mountains, Short mountains, Mill Creek mountains and Pattersons Creek mountains in Hampshire county; South Fork mountains and Jackson mountains in Pendleton county; Canaan and Laurel mountains in Tucker county; Cheat, Shavers and Dry Fork mountains in Randolph county; Brier knob, Droop, Cranberry, Black, Elk, Brown and Beaver mountains in Pocahontas county; Meadow, Clear Creek, Yellow Pine and Brier mountains in Greenbrier county; Black Oak and Stony Ridge mountains in Mercer county; Flat-Top mountains between Mercer and Raleigh counties; Wolf Creek mountain and Swopes Knob in Monroe county; Keeney's Knob in Summers county, 3,955 feet in height; Cold Knob in Greenbrier, 4,318 feet; High Knob in Randolph, 4,710 feet; Spruce Knob in Pocahontas, 4,730 feet; and Spruce Knob in Pendleton, 4,780.

Elevations at the various towns and villages in this region are Strouds Ferry, Nicholas county, 2,009 feet; Camden-on-Gauley, Webster county, 2,018 feet; Tuckahoe, Greenbrier county, 2,035 feet; Coaldale, McDowell county, 2,336 feet; Terra Alta, Preston county, 2,550 feet; Horton, Randolph county, 2,729 feet; Fairfax, Grant county, 3,060 feet; Stony Creek Station, Pocahontas county, 3,223 feet.

The Potomac Region.

That portion of the State lying east of the Allegheny mountains is known as the Potomac region. It is composed of the five counties of Jefferson, Berkeley, Morgan, Hampshire and Mineral. The area of this section is 1,780 square miles, or 1,139,200 acres. The lower Shenandoah Valley extends through Jefferson and Berkeley counties, rich, highly cultivated, one of the garden spots of the continent. Fully eighty per cent. of these two counties is composed of level or rolling land, while wide bottoms border the South Branch and Cacapon rivers and New Creek and Pattersons Creek.

At Harpers Ferry the elevation is but 280 feet above tide-water, sixty miles away. This is the lowest depression in the State. At Shenandoah Junction, in Jefferson

county, the elevation is 536 feet; at Martinsburg, in Berkeley county, it is 445 feet; at Green Springs, in Hampshire county, 550 feet; at Keyser, in Mineral county, 805 feet; at Piedmont, in Mineral county, 910 feet. The altitude of Loudon Heights, in Jefferson county, is 1,000 feet, and of Sleepy Creek mountains in Berkeley and Morgan counties, 1,500 feet.

In this region is found the best general agricultural life of the State, and the best orcharding. On many of the farms are to be found homes not only comfortable, but actually luxurious, and the 80,000 people who live there comprise some of the very highest class citizenship of West Virginia.

General Observations.

Such are the cold facts regarding the five regions that make up the State of West Virginia. They convey to the reader nothing of the splendid scenic beauty of the State, of the vast wealth of natural resources covered by the soil, of the prodigious progress made by the State during the slightly more than fifty years of its existence as an independent commonwealth. Henry Howe, who almost three-quarters of a century ago rode horseback through the territory that now forms the State, furnishes, in his book, "Virginia: Its History and Antiquities," the following fine description of the "beauties of earth and air and sky" which met his eye:

"As you descend the mountain path faintly discerned before you, and breathe the pure, fresh air of the hills, cast your eye on the most impressive scenes, for Nature is there in all her glory. Far down the valley to the right winds a lovely stream; there hidden by the foliage over-arching its bright waters; anon it appears in a clearing again, concealed by a sweep of the mountain you are descending; still beyond it seems diminished to a silvery thread. To the right and front is a huge mountain in luxuriant verdure, at places curving far into the plain, and at those points and at the summits bathed in a sea of golden light; at others receding, thrown into dark, somber, forbidding shades. Beyond are mountains piled on mountains like an up-tossed sea of ridges, until they melt away in the distance and imagination fancies others still farther on. High above all the blue ether, float yon clouds of snowy white, and far above them, in majestic flight, sails the bird of the mountain, with an air as wild, as free as the spirit of liberty. How everything is rejoicing all around! Innumerable songsters are warbling sweet music; those wild flowers, with scarce the morning dew from off their tips, are opening their bright cheeks to the sun; and even the tiny insects flitting through the air, join in the universal hallelujah! Now fast losing the scene, you are entering the dark, solemn forest, densely matted above with vines excluding the light of day. You are soon at the base of the mountain, and, from the copse below you, out starts a deer! The graceful animal pricks up its ears, distends its nostrils in fear, and gathering its slender limbs for a spring, bounds away over hillocks and through ravines and is seen no more. The stream, broad and shallow, is widening itself across your way with gentle murmurs. Splash! splash! go your horse's feet into the water; forty times in ten miles does it cross your road, and in various places for many hundred yards your course is directly through it."

J. R. Dodge, who visited the State soon after its formation, wrote of it as follows:

"The scenery of West Virginia is worthy of a volume, rather than a fragment of a chapter. Under the influence

of so genial a climate that semi-tropical forms of vegetation are almost native of its soil, its flora may safely be presumed to equal, if not surpass, in variety and magnificence, the wealth of any other State or continent. In its fauna, it is equally distinguished. Birds, beautiful in plumage and sweet in song, give life and grace and cheerfulness to field and forest. The surface is infinite variety; rills meet rivulets and rivulets swell into rivers which leap their mountain barriers and quietly subside into the placidity of the plains below. Mountains rise like little Alps on Alps; glades—those meadows of the mountains—freshen the summer atmosphere with delicious coldness; cultivated slopes, as in Greenbrier and other of the older counties, move the imagination as by a wand of enchantment; deep, winding, fertile valleys lie at the foot of beetling bluffs, full of the fatness of fertility. Everywhere the vision is greeted with variety and beauty. Nature has not only been partial but prodigal.

"European travelers have been enraptured with the ever-varying scenery of the Cheat river region, as seen in a trip by rail; and none have been more impressed with it than those who have climbed the Alps and viewed with awe their towering heights and darkling depths beneath. It exerts unwonted emotions thus to wind around the steep side of mountain spur and emerge from its shadows into a sunlit slope that falls abruptly away from the very edge of the car, hundreds of feet, and reveals at the bottom a long and winding valley, a singularly dark stream, whose chocolate colored waters contrast while harmonizing with the forest growth that reaches from the golden sunlight of the mountain top down to the river's brink. * * * * The sturdiness of the forests, the hardy vigor of all vegetable life, the munificence of all visible nature, impress the traveler accustomed to see bare rock and stunted growth amid mountain scenery. There is nothing of poverty suggested and no intimation of sterility; few jutting crags are seen, unless hewn out of the mountain side in cutting the wild pathway of the railroad, and no rough rocks piled, heap on heap, offend the eye as it sweeps the gracefully rounded knobs. * * * * Lonely as the vast reaches of the woodland appear, and bold and varied as is the mountain face, there is always present the suggestion that every foot is habitable—that the hand of art may heighten the beauties and soften the few asperities of the scene. Thus the traveler pursues his way down the Alleghenian slope, through scenery similar in its type, but slowly and continually modifying till it becomes noticeable only as a hilly, fruitful country divided into farms, naturally suited to the diverse uses of meadows, pasturage, and tillage, and watered with frequent and rapid streams."

Some Striking Natural Wonders.

Among the many scenes of majestic beauty with which this State has been endowed there are some of such striking character as to be worthy of special mention. Among these is the famous "Hawk's Nest," a towering precipice that overlooks New River, where that stream dashes through its wildest gorge. A visitor to this masterpiece of Nature has thus poetically described it:

"Imagine yourself standing upon its projecting point, a perpendicular rock, 1,292 feet from the valley below,

'On a rock whose haughty brow
Frowns o'er old Conway's foaming flood.'

"Before you, as you look to the east, the New River is seen for the distance, perhaps, of several miles, winding,

or rather rushing, tumbling and foaming through the towering cliffs which environ it. Sweeping by this lofty promontory on which you stand, it suddenly turns its course in a southwest direction, and presents in the whole distance several beautiful cascades which send to the listening ear the far off but lulling sound of their waters. The cliffs themselves, judging by the horizontal and corresponding strata of rock on either side, seem to have been originally united, but torn asunder by some strong convulsion of nature, in order to give free passage to the narrow but angry torrent which rolls majestically at their feet. The autumnal season gives to this imposing picture a magnificent and gorgeous drapery of which no man whose vision has been confined to lowland scenery can have the slightest conception."

"Hanging Rocks" in Hampshire county, 160 feet in height and leaning, Pisa like, far out over the perpendicular, to shadow the South Branch river; the "Trough," in Hardy county, through which the South Branch river flows for seven miles, walled in on either side by solid mountains that slope back as evenly and symmetrically as though formed by the hand of man; the "Mountain Gate," in Hardy county, near Moorefield; "Image Rocks,"

near Petersburg, Grant county, where the South Branch has cut its way through Pattersons Creek mountain; "Greenland Gap," in Grant county; "Ice Mountain," in Hampshire county; "Lost River," in Hardy county, dashing up against a solid mountain wall, and then disappearing under it, to again appear two miles away to swell the volume of the Great Cacapon; the "Mouth of Seneca," in Randolph county; "Organ Cave," in Monroe county; "Peters Mountain," in Monroe county, with its crest stretching away in a straight line for forty miles; the New River canons, beautiful beyond words to describe in their rough-hewn grandeur, where the traveler may stand upon the mountain top and see the waters of the river flowing onward like destiny, hundreds of feet below—these are but a few of the most notable of the natural wonders of this wonderland called West Virginia.

Add to these scores of other scenes of less note, but no less beauty, on the Elk, the Gauley, the Tygart's Valley and the Cheat rivers, the panoramic views from the tops of the Alleghenies, where mountain height piles upon mountain height for as far as the eye can see, and some idea may be gained of the picturesque beauty of a State that has been justly termed "a realm of beautiful modulations."

Rivers and Drainage of West Virginia.

West Virginia has numerous beautiful rivers and many smaller ever-flowing streams, which make the State one of the best watered commonwealths of the sisterhood. Most of these streams take their rise in the plateau region, or high up in the Allegheny highland, whence they pour with rapid current down the mountain sides, across wide plateaus, and through fertile valleys, to join themselves with the stronger tides that flow outward to seek the seas.

The river system of the State is really divided into two systems, one rushing eastward to help form the Potomac and, through its channel and the great Chesapeake Bay, reach the Atlantic ocean; the waters of the other flowing westward to swell the current of the Ohio, and by way of the mighty Mississippi find the waters of the Gulf of Mexico. In fact these two great rivers—the Potomac and the Ohio—take their rise, in part, at least, in a spot known as the "Birthplace of Rivers," within a few rods of each other. At "Allegheny Top," at the line between the two Virginias where the counties of Pocahontas and Pendleton, West Virginia, and Highland, Virginia, corner, rise six beautiful mountain streams which, rushing down the mountain sides, increasing as they onward flow, soon attain the size and majesty of rivers. One of these, rising just beyond the eastern border of West Virginia, flows eastward to become Jacksons river, and to join its flood with that of the James. Two others, the Elk and the Greenbrier, flow to the southwest, and both mingle their tides with that of the Great Kanawha. Two others still, the Tygarts Valley and the Cheat, hasten down their respective slopes to the northwest, the former to unite with the West Fork near Fairmont to make the Monongahela, the other to flow into the Monongahela before it joins forces with the Alleghany to make the Ohio. The sixth river to take its rise from the crystal fountains on this lofty mountain apex is the South Branch, which, running swiftly down the northeast slope, through the counties of Pendleton, Hardy and Hampshire, meets the

North Branch at the mountain base and with it forms the Potomac.

The Potomac River.

The Potomac, sole eastward flowing river of the State, drains the counties of the Eastern Panhandle, and flows away through the Blue Ridge into Chesapeake Bay. It is formed by the confluence of the North Branch and South Branch, and its basin forms a distinct physical division of the State, as hitherto described.

The North Branch rises in Tucker county, at the southwest corner of Maryland, at the "Fairfax Stone," on Backbone mountain, 3,100 feet above sea level. Flowing eastwardly down the steep declivities among which it finds its source, and then along gentler inclines for a hundred miles, it unites with the South Branch at an altitude of but 540 feet. Its descent is, therefore, 2,560 feet, or an average of more than 25 feet to the mile. It is joined in its course on the West Virginia side by the waters of Stony river and Abrahams Creek, from Tucker county; New Creek and Pattersons creek, from Mineral county. From Maryland it receives the waters of Savage river, Wills creek, Evitts creek and Sugar run, the last named flowing into it at the city of Cumberland.

The South Branch, as already told, rises in the "Birthplace of Rivers," at an elevation of 3,000 feet. Flowing northeast through the counties of Pendleton, Grant, Hardy and Hampshire, it joins the North Branch. Its length is about 200 miles, and in its course it is joined by the waters of North Fork, South Fork, North Mill creek, South Mill creek, in Pendleton; Looneys creek in Grant, and Mill creek in Hampshire. Its descent from head to mouth is 2,500 feet, or 12 to the mile. Along its course is much beautiful scenery, and many acres of fertile valley land.

The Potomac, formed, as described, by the confluence of the North Branch and South Branch, crookedly flows for about 100 miles, forming the line between Maryland and

West Virginia, to where it breaks through the Blue Ridge into the State of Virginia, and so on to Chesapeake bay. Its fall from the place of its formation to the point of its leave-taking of West Virginia is but 2.6 feet to the mile, the total being 260 feet in 100 miles. From the West Virginia side the Potomac takes the waters of Little Cacapon, and Great Cacapon, in Hampshire county, the latter rising in Hardy county, where its greatest tributary is Lost river; Sir Johns run and Sleepy creek, in Morgan county; Back creek and Opequon river, in Berkeley county, and the beautiful Shenandoah, which, after draining almost the entire Shenandoah Valley, comes to the Potomac at Harpers Ferry, in Jefferson county, just before it breaks through the Blue Ridge in its final spurt to tidewater.

Rivers Running to the West.

The rivers that take their rise on the western slope of the Allegheny mountains, and find their outlet to tidewater in the Gulf of Mexico, drain more than 56 per cent. of the area of West Virginia, and are, therefore, far more numerous and of far greater importance to the State as a whole than are those which join with the Potomac and take the eastward course to the sea.

First in importance as in size—made up finally, indeed, so far as West Virginia is concerned, by the combined waters of all the other westward-running waters of the State—is the Ohio. This is formed by the confluence of the Monongahela and Allegheny rivers at Pittsburgh, and of these two constituent parts the former finds its source in West Virginia, and is made up almost entirely of waters from this State. From its beginning the Ohio river runs northward for a good many miles, and then, turning into the southwest, holds that general course for a thousand miles, until it loses itself in the mighty flood of the Mississippi at Cairo, Illinois. Beginning at the northernmost point of West Virginia, the Ohio for 256 miles runs through the territory of this State, for while it forms the boundary line, it is from its eastern edge to low water mark on its western side within the jurisdiction of West Virginia.

It is one of the State's most valuable assets—a royal highway of commerce and civilization. It has been poetically said of it that:

"LaSalle discovered it; DeCeleron buried leaden plates at the mouths of its tributaries, bearing inscriptions asserting the claims of France to it; Great Britain won it; the United States possessed it; and West Virginia exercises jurisdiction over it for nearly three hundred miles."

Into the Ohio pour from this State the waters of the Monongahela, the Little Kanawha, the Great Kanawha, the Gyandotte, the Twelve-Pole and the Big Sandy, as well as those of numerous other smaller streams that find their sources in West Virginia.

The Monongahela River.

The Monongahela is formed by the junction of the Tygarts Valley river and the West Fork, the former being the principal branch. These two streams come together near Fairmont, in Marion county. The Tygarts Valley rises on the slope of Cheat River mountain in the eastern part of Randolph county, at the place heretofore described as the "Birthplace of Rivers," and flows along the eastern base of the Rich mountains until it breaks through toward the west, and then runs through Barbour and Taylor counties and into Marion, where it merges itself with the West Fork into the Monongahela, about 100 miles from its source. Its altitude at Beverly, in Randolph county,

is 1,941 feet above sea level, while its altitude at its mouth is 885 feet. The descent, therefore, is 1,056 feet, or a little more than ten feet to the mile.

The Tygarts Valley in its course takes in the waters of Middle Fork, in Barbour county, which stream rises in Webster county, and forms the boundary line between Upshur and Randolph. A few miles lower down, but still in Barbour county, the Buckhannon river empties into the Tygarts Valley, with a volume equalling its own. The source of the Buckhannon river is also in Webster county.

The West Fork river, rises in the southern part of Lewis county and flows centrally through it, across Harrison county, and into Marion, where it joins the Tygarts Valley. In Lewis county it is joined by the waters of Hackers creek, Freemans creek, Sand Fork and Coal-stone creek; in Harrison are added the waters of Lost creek, Elk creek, Simpson creek and Wolf creek. In its length of practically 100 miles it has a fall of 207 feet, making it one of the State's most sluggish streams.

From the junction by which it is formed the Monongahela flows northward to the south line of Pennsylvania, and thence through that State to its junction with the Allegheny, there forming the Ohio.

At Point Marion, just within the State of Pennsylvania, the Monongahela receives the waters of the Cheat river, its largest eastern confluent. This is a remarkable stream. It is formed by the waters of numerous streams that rise in the "Birthplace of Rivers," the principal ones being Shavers Fork, Glade Fork, Laurel Fork, and Dry Fork, which come together in Tucker county. Thus formed, the Cheat river flows through Preston county, receiving the waters of Wolf creek and Buffalo creek, breaks through Briar mountain, takes in Middle creek, Laurel fork and Sandy Creek, runs through a corner of Monongalia county into Pennsylvania, and unites with the Monongahela at Point Marion, as stated above.

The Little Kanawha River.

The Little Kanawha river may be said to interlock with the West Fork of the Monongahela, because its source is found on the Cumberland Plateau in springs that rise in Braxton, Lewis and Upshur counties, near those of the latter stream. Thence it flows down through Gilmer, Calhoun, Wirt and Wood counties to the Ohio at Parkersburg. At Flatwoods, in Braxton county, its waters are 1,121 feet above sea level, while at its mouth the altitude is 600 feet, making its fall less than three feet to the mile. In Gilmer county its principal tributaries are Salt creek, Sand Fork, Leading creek, Cedar creek and Taners Fork, in Calhoun it receives the waters of Steer creek; in Wirt those of West Fork, Spring creek and Reedy creek, and on the boundary between Wirt and Wood it takes in Hughes river, its largest tributary.

The Great Kanawha.

The Great Kanawha river, the largest and most important tributary of the Ohio in West Virginia, is formed by the confluence of the New and the Gauley rivers, two miles above Kanawha Falls, and 100 hundred miles from the point at which it flows into the Ohio. Of the two streams of which it is made up the larger is the New river, which rises in western North Carolina and flows from that State into Virginia, through which its course lies for many miles, and whence it turns into West Virginia through a gap between East mountain and Peters mountain, between the counties of Mercer and Monroe. From the State line it flows through Mercer and Summers

counties, between Summers and Raleigh, and for a long distance through Fayette, to its junction with the Gauley. In Mercer county it takes the waters of East river and in Monroe those of Indian creek, while in Summers it receives those of Bluestone river and Greenbrier river, the latter of which, a beautiful, picturesque stream, rises in the "Birthplace of Rivers," to which allusion has so frequently been made. Below the mouth of the Greenbrier the New River is swelled by the waters of Lick creek, Meadow creek, Keeneys creek and Mill creek on the east side, and those of Glade creek, Piney creek, Loup creek and Wolf creek from the west side.

Gauley river rises on the Allegheny Highland in the western portion of Pocahontas county, southern portion of Webster and northern portion of Greenbrier, and flows through Nicholas and into Fayette to its confluence with the New. In Webster its chief feeder is Williams river, while in Nicholas it receives Cranberry river, Cherry river, Persinger creek, Muddlety creek, Peters creek, Twenty-mile creek and Meadow river. The altitude at the mouth of Williams river is 2,215 feet, while that at the mouth of Gauley is but 650 feet, making the descent between the two points, less than one hundred miles distant, 1,565 feet.

The Great Kanawha, thus formed by the junction of these two rivers, after plunging over Kanawha Falls, 22 feet in height, flows through Kanawha, Putnam and Mason counties to the Ohio at Point Pleasant. In its course it receives the waters of Lower Loup creek, Paint creek, Kelleys creek, Hughes creek, Lens creek, Cabin creek and Witchers creek, and at Charleston, in Kanawha county, it is joined by the Elk river, its largest tributary. The Elk, too, finds its source in the "Birthplace of Rivers," and flows through Pocahontas, Webster, Braxton, Clay and part of Kanawha counties. At Webster Springs in Webster county its altitude is 1,463 feet, while at its mouth it is 603 feet, a difference of 860 feet in almost 150 miles, a remarkably gradual descent considering the character of the country through which its course lies. Twelve miles below the mouth of the Elk the Coal river flows into the Great Kanawha, and seven miles farther down the Pocatalico comes in.

As stated previously, the length of the Great Kanawha from the junction of the New and Gauley rivers to its mouth is 100 miles. The fall is 100 feet, or one foot to the mile, making a current comparatively slow for the waters of a hill-country stream.

The Guyandotte River.

The Guyandotte river, which flows into the Ohio about forty miles below the mouth of the Great Kanawha, rises in Basin Springs, on the Cumberland Plateau, in Wyoming county. Thence it flows through Logan and Lincoln counties into Cabell, where it empties itself into the Ohio, within the confines of the City of Huntington. In Wyoming county its principal affluents are Pennack creek, Rockcastle creek, Indian creek and Clear Fork; in Logan county, Buffalo creek, Rich creek and Island creek are the most important streams flowing into it; at Barboursville, in Cabell county, it receives its most important branch, Mud river. The altitude of the Guyandotte at Richview, in Wyoming county, is 1,275 feet, that at its mouth is 560 feet, showing a fall of 715 feet in a crooked course of approximately 175 miles.

The Twelve-Pole River.

A short distance below the mouth of the Guyandotte comes in Twelve-Pole river, the only one of the rivers feeding the Ohio from West Virginia that rises within the Ohio Valley Region. The course of the Twelve-Pole is found at the base of Guyan ridge, in Mingo county, whence it flows into Wayne, where its Right and Left Forks unite, and thus continues through that county into the Ohio. In Wayne county it receives also the waters of Klahs creek, Camp creek and Beech creek. Its total length is less than 100 miles and its fall from source to mouth is but 231 feet, or a fraction more than two feet to the mile.

The Big Sandy River.

The Big Sandy, last of the State's streams to flow into the Ohio, is formed by the confluence of Tug river and Levisa Fork, and makes the boundary line between West Virginia and Kentucky for 130 miles. The Tug river, the branch that rises in West Virginia, finds its source on the northern slope of Dividing ridge, in McDowell county, on the Allegheny Highland, its upper tributaries being Elkhorn creek, Sand Fork, Dry Fork and Panther creek. In Mingo county the tributary of the Big Sandy is Pigeon creek, and in Wayne county Mill creek. The river forms the boundary line of Wyoming, Mingo and Wayne counties, and it empties into the Ohio at the State's most westerly corner, where the town of Kenova stands in West Virginia, with Catlettsburg immediately opposite in Kentucky. The altitude at Ennis, near the source of the Elkhorn, is 1,995 feet, and at the mouth of Pigeon, 103 miles away, it is but 630 feet, a fall of 1,365 feet, or 13½ feet to the mile. The "Roughs of Tug," composed of a series of rapids extending over several miles, from one of the wildest, most remarkable bits of scenery in the State.

Observations.

Such are the principal water courses of West Virginia, four, the Potomac, the Monongahela, the Great Kanawha and the Big Sandy—having their sources on the Allegheny Highlands; two—the Little Kanawha and the Guyandotte—rising on the Cumberland Plateau; and one—The Twelve-Pole—confined for its full length, from source to mouth, to the Ohio Valley Region. Of these rivers the Potomac and its branches drain 3,500 square miles of the State's territory; the Monongahela and its tributaries drain 4,300 square miles; the Little Kanawha and its tributaries, 2,200; the Great Kanawha and its tributaries, 8,800; the Guyandotte and its tributaries, 1,800; the Twelve-Pole and its tributaries, 500; the Big Sandy and its tributaries, 1,300; other streams, not described herein, 2,315 square miles, making a total of 24,315 square miles.

It is doubtful if any other equal extent of land in this or any other country has a natural drainage system so comprehensive and so perfect. There is not a square mile of territory in the State that has not proper drainage, and there is not in the entire State a square mile of stagnant water. Not only do these streams furnish a drainage system by which surplus water is carried off the ground, but they also furnish an ever-living, always-sparkling supply of water for the many purposes for which that element is intended, and for which it is necessary.

Of the great value, actual and potential, of some of these streams in the matter of transportation and for the purpose of generating power for a multiplicity of uses, other chapters of this book will treat at length.

Origin and Distribution of the State's Soils.

Of all the layers that go to make up the earth's crust there is none other so full of potential wealth as the soil. It is the supreme gift of the ages; man's most precious inheritance from the store-house of Nature.

Never before has it been so clearly set forth and so generally perceived that the roots of all human society, like those of the trees of the forest, strike deep into the earth, drawing thence the sustenance which maintains all its strength and life.

The soils of West Virginia are principally native and come from native rocks, which are limestone and sandstone and various admixtures of shales and clays, forming, respectively, calcareous soils, sandy soils, and loams.

The oldest and most fertile soil-making rocks are in the eastern counties.

The hardest and most resistant and least soluble rocks are in the mountain counties.

The thirty western counties are composed of sandstones, shales and limestones, in varying proportions. About all the soils of the State, derived from native rocks, are either residual, over-lying the rocks from which they were formed, or they are alluvial soils, which are of mixed origin, being partly formed where they are found, and partly derived from the adjacent hills. East of the Allegheny mountains the soils are of three principal varieties, those formed from the limestones, those formed from the shales, and the river and creek bottoms of alluvial origin.

The soils of the wide, flat-topped hills are formed by the freezing and thawing and dissolving of the rocks that make the hills, together with the decay of leaves, logs and other vegetable matter. The decomposition of the coarse material is hastened by the action of the roots of trees creeping into it, by the action of acids from decaying plants dissolving the soluble parts, and at last is more finely comminuted by wood worms and earth worms grinding it up ready for the plants. A soil produced in this manner is a soil of disintegration, and is usually found not far from the parent rock that yielded it.

The soil along the river and creek bottoms has been carried there from anywhere within the basin of the streams, and is consequently a mixture of whatever beds outcrop in such basin. Such soil is called a soil of transportation, and from its depth and variety of material is less liable to rapid exhaustion than a soil of disintegration, such as is found on the hill-tops.

With the exception of a small amount of soil brought into the State from the head of New River, and a slight fringe along the Ohio brought from the States of Ohio and Pennsylvania, all the soils of the State, both of transportation and of disintegration, are native. Hence, whatever soil has been exhausted can be repaired from materials close at hand in each neighborhood. West Virginia has none of the soils of transportation which the great ice sheet brought over the State to the north and west.

Now, the availability of land for farming depends upon two factors: First, quality of soil; second, topography.

The surface of the eastern half of the State is composed of somewhat parallel ridges running from northeast to southwest. These ridges are usually great arches or folds in the different rocks, the tops of the folds forming the ridges and the troughs between the folds making the long valleys. So that, in passing from east to west, the traveler quickly goes from one geological formation to another, while in progressing toward southwest or south

he travels for a long distance in each formation, and it is soon evident that each formation extends in a long, narrow belt in the direction of the mountain ranges of the Appalachian system.

Where the great sandstones stand at an angle the streams have cut their channels far below the general level of the surrounding country. The ridges are sharp, the sides steep, and the whole topography is rough. When the principal rocks are limestones and shales, these weather down more regularly; the slopes of the hills and valleys are rounded, the outlines softer, the surface smoother, and the topography more suitable for farming. Shales and limestones hold more fertilizing material than sandstones, and also yield their soluble parts more readily for the use of plants. Hence they make more fertile soils.

With these preliminary remarks we will proceed to sketch briefly the parts of the State that are of most importance to the agriculturist.

The Agricultural Soils.

That Jefferson and Berkeley counties occupy such a high place in the list of agricultural counties of the State is due to the fact that they possess two formations of great value, the Shenandoah limestone and the Martinsburg shale. Of these the Shenandoah limestone is the more important. It is a great rock of several thousands of feet in thickness, somewhat tilted, and making a very large area of farming land in the two counties through which it prevails. Farms have been operated upon it for almost two hundred years, and are still apparently as productive as ever.

The Martinsburg shale overlies the limestone, and in long belts makes the surface. The soil it yields is not so good as the limestone soil; but it seems specially adapted to fruit growing, and the belt of this shale extending toward Winchester, Virginia, has long been known as Apple-Pie Ridge.

Passing along into Hampshire, Hardy, Mineral, Grant and Pendleton counties, the soils are found to be of more diverse origin. The principal good soil makers are the Shenandoah limestone, Martinsburg shale, Lewiston limestone and Romney shale. All of these formations extend in long belts across these counties to the southwest, and situated on them are fine farms and grazing lands. The alluvial lands of these counties are also extensive and are famous for their fertility.

Passing a little farther west another belt of limestone, known as the Greenbrier limestone, is encountered. This great formation rises above the surface on lower Cheat, and extends through the counties of Preston, Tucker, Randolph, Pocahontas, Greenbrier and Monroe. It becomes of great thickness and makes large areas of fine lands and rich mountain pastures about the headwaters of the Cheat and the Greenbrier rivers. Above and below it are also fine areas of shale lands. This belt of shale and limestone may be called the buckwheat district.

West of this comes the great series of sandstones, shales and limestones called the coal measures. These rocks form soils of moderate fertility in the coal bearing counties, which are composed largely of red sandstones and shales.

Above the coal measures is another series of rocks, in some counties largely of red sandstone and shale. These form the counties of Doddridge, Ritchie, Wood, Pleas-

ants, Tyler, Wetzel and Marshall. Many parts of these counties are formed of rough, steep hills, but little suited for farming. But much of the soil is good, and when kept where it is formed affords good grass lands. These counties are known as sheep counties from the large number and fine quality of sheep raised in them. Farming should be reduced to a minimum in these counties and only the low-lands plowed or cultivated. The forests should be replaced by a coating of grass, thus covering and holding the soil that has been ages in forming.

Distribution of Crops.

Rainfall, temperature and soil are the three principal factors to be considered in agricultural history.

Rainfall in West Virginia averages from 35 to 50 inches a year. This is sufficient for the production of crops in all parts of the State. As the rainfall is ample in every month during the year its distribution need not be considered in detail.

Temperature is determined by both latitude and elevation. In West Virginia elevation is a larger factor than latitude. The agricultural and grazing lands of the State have a range of about 3,000 feet in altitude, as the difference between the lowest and highest points in the State is about 4,600 feet. These two points are, respectively, in Jefferson and Pendleton counties. But the general range is about 3,000 feet, which gives a difference in temperature of 10 to 15 degrees in the growing season. This is sufficient to produce a marked diversity in the crops grown in different parts of the State.

The three principal crops, corn, wheat and oats, are raised in every county in the State; but they are very unequally distributed as to amount. This is due partly to temperature and partly to soil conditions. Rye was formerly raised all over the State, but is now limited to about twenty counties. Buckwheat and tobacco are crops that are limited by temperature and soil conditions to parts of the State that differ greatly from each other. Tobacco is confined to the warm southwestern counties, and buckwheat to the cold upland counties.

Tobacco.

Tobacco culture has undergone great change in the past 45 years. In 1870 it was raised in twenty counties in the State. Since that time its culture has been largely discontinued in some of these counties, while an equal or greater number have taken up the business, and the output has very largely grown. During the past half dozen years, indeed, the tobacco crop has come to be one of the most important in a number of the counties in the southwestern portion of the State, notably Putnam, Lincoln, Wayne, Cabell, Mason and Jackson, while considerable quantities are grown in Wirt, Summers, Fayette, Greenbrier, Monroe, Calhoun and Braxton, and less quantities in some other counties. Large tobacco warehouses have been established at Huntington in the past few years, and millions of pounds are annually brought there for sale.

The soils that yield the best crops of tobacco are found in the river and creek bottoms and those of the light, sandy lands found in the first and second terraces up from the streams. It was long ago noted that the highest grade soils do not produce the highest grades of tobacco, but that a lighter soil that warms up readily will produce a lighter, finer quality in the plant.

The best tobacco region of the State is that south of the Little Kanawha river, in which section the larger portion of the crop will doubtless continue to be produced.

The Rye Crop.

The changes in the rye crop have been somewhat similar to those noted in tobacco. In 1870 the cultivation of rye was general, every county producing some, and the total amount raised in the State was 278,000 bushels. Now it is confined to a comparatively few counties and the output is hardly more than half what it was 45 years ago. The soil conditions best for the successful cultivation of rye are much the same as those best adapted to wheat, but it thrives better in a little cooler temperature, and so the crop in this State is now almost entirely confined to the upland counties. Very little is found below the level of 1,500 feet. The lands in the lower counties which formerly were utilized for its cultivation are now occupied by wheat and corn. A food crop of poor quality has thus, in these lowland counties, been superseded by crops of much better quality.

Buckwheat.

Buckwheat thrives well on the cool glade lands of the upland counties, and on the rough mountain slopes where the cultivation of other cereals would cause loss of soil. Besides yielding a crop of about 20 bushels to the acre, it is a valuable auxiliary in ridding new lands of sprouts and weeds, thus aiding in its preparation for the permanent carpet of rich grass. The buckwheat area extends over 16 counties. It has its center in Preston county, which produces more buckwheat than any other county in the United States. The main body of the buckwheat district lies along the western slope of the Alleghenies, extending from Preston county on the north to Raleigh and Mercer on the south. It embraces the counties of Preston, Barbour, Hampshire, Raleigh, Tucker, Randolph, Upshur, Nicholas, Pendleton, Hardy, Pocahontas, Greenbrier, Monroe, Monongalia, Taylor, Fayette, Morgan and some others to a less degree. The order in which the counties are named here is about their order in point of production. The crop is seldom found below an elevation of 1,200 feet and the average level is probably 2,000 feet. The soils in which it is grown are of great variety, and range from the lower coal measure soils of Preston, Upshur and Fayette to the silurian limestone soils of Hardy and Pendleton.

The Oats Crop.

The oats crop is distributed generally throughout the State, some of the grain being raised in every county. But the elevation and latitude of various counties distinctly show their effect upon the production. The counties producing most largely of oats are the mountain counties and those of the Northern Panhandle, the center of production again being Preston.

The crop flourishes on every soil of the State, from the lower silurian limestone and shales up to the red lands of the Dunkard formation. The crop distribution seems to be governed more by climate than by soil. There has been little variation in the amount of oats produced in the State during the past few years, so that the crop may almost be said to have reached its equilibrium.

The Wheat Crop.

Wheat began to be produced in the valley counties, and these continue to be the largest producers. In 1870 one-fifth of the counties in the State produced three-fifths of the State's wheat crop. These counties belonged to two classes: the valley counties and those with large

area of limestone. In 1900 the 11 counties producing the greatest amount of wheat remained the same, with two exceptions, and were still producing more than half the State's crop. They were Jefferson, Berkeley, Mason, Jackson, Wood, Marshall, Greenbrier, Harrison, Monroe, Monongalia, and Wetzel. All have fine river bottoms, and four of them, Jefferson, Berkeley, Greenbrier and Monroe, have large areas of fine limestone soils.

In 1870, 33 counties produced 93 per cent. of all the wheat grown in West Virginia, and these same counties still yield practically the entire product. They are, in the order of the amount of their production:

Jefferson, Berkeley, Mason, Jackson, Wood, Marshall, Greenbrier, Harrison, Monroe, Monongalia, Wetzel, Putnam, Cabell, Kanawha, Marion, Hampshire, Ritchie, Roane, Lewis, Barbour, Preston, Pendleton, Tyler, Braxton, Wirt, Hardy, Gilmer, Summers, Morgan, Wayne, Lincoln, Mercer and Pocahontas.

Since crop figures began to be kept in 1870 there has been a very large increase in the production in the valley counties of Mason, Putnam, Jackson, Wood, Tyler and Wetzel, and in the limestone counties of Greenbrier and Monroe.

The Corn Crop.

No other crop brought forth by the soil of West Virginia approaches corn in value or in distribution throughout the various sections. It is grown in every county, and has been the mainstay of the people as a food crop since the first settlers built their rude cabins more than a century and a half ago and year by year the amount produced has increased.

Like wheat it grows prolifically in the limestone and shale lands of the eastern counties, and in the river bottoms of the western counties. So the counties of highest production face the Ohio river on the west or the Potomac on the east. But while reaching its highest degree of development in the same counties that produce most largely of wheat, its distribution is somewhat more general. It can be grown on newer and rougher ground than wheat. It is, par excellence, the first crop to be used in reducing wild land to a state of cultivation, and even in the neglected manner in which it is too often allowed to grow, makes a good crop in spite of its bad treatment. It is the standard food crop of a majority of the people, and of their domestic animals.

The county that has generally, for a number of years, produced the largest crop, is Wayne, whose bottom lands are but 500 feet above sea level, yet Pendleton, at an elevation of 4,000 feet and more, also produces corn in sufficient amount to give it important place among the products of the county. Good crops, however, are rarely found above an elevation of 2,500 feet. The distribution of corn has not changed greatly in forty years, though the amount grown in the State has steadily risen. Thirty-three counties produced 83 per cent. of the crop in 1870, and the same counties were producing practically the same percentage of the State's production in 1914. This leaves 22 counties to produce but about one-fifth of the crop, which is less than half what they should produce. It may be that these counties will later be brought up somewhat closer to their proper proportionate output by reason of further felling of the forests and clearing of the land. But the production of corn, as that of wheat, will unquestionably be found to continue largest in those counties lying at the lower levels.

The 33 counties producing the largest proportion of the

corn of the State in the general order of their production, are Wayne, Mason, Jefferson, Kanawha, Marshall, Jackson, Lincoln, Roane, Wetzel, Berkeley, Wood, Braxton, Putnam, Harrison, Cabell, Greenbrier, Calhoun, Lewis, Ritchie, Gilmer, Monroe, Marion, Monongalia, Barbour, Hardy, Wirt, Tyler, Nicholas, Ohio, Doddridge, Boone, Upshur, Randolph.

The State's Grasses.

West Virginia lies in the blue grass area, and in numerous localities that most nutritious grass only needs that the underbrush be hacked away and the sun allowed to strike the soil, to spring up and cover the ground with its verdure. Clover and timothy thrive also, together with numerous native grasses that render the State almost ideal for the growing of livestock. Blue grass and white clover lead all the others in their adaptability to the soil and climate of the various counties and localities. These two are found growing in the alluvial soils of the bottom lands and the rich slopes of the hills in every county of the State, and combine with the wild grasses to afford excellent pasturage for sheep and cattle. In some portions of the State, however, bluegrass grows so luxuriantly as to crowd out other grasses, and in such areas cattle for the high-priced export trade are raised and finished for the market. In these same sections fine wool is largely grown also. The soils of these areas are largely composed of calcareous formations and sandstone intimately mixed, and are productive to a high degree of all kinds of agricultural and horticultural crops, as well as of the various kinds of grasses. It were better, however, if bluegrass lands were never plowed, for a good bluegrass sod is not only a most profitable possession, but it is an excellent soil protector as well. There are bluegrass pastures in the State that have not been disturbed for forty years, on which the annual crop is as luxuriant as ever.

Timothy is the state's chief hay crop, yielding from one to two tons per acre annually under ordinary cultivation. Red top ranks next as a hay crop, and is also a very good pasture crop. It is well adapted to the heavy clay soils that are inclined to be wet.

Orchard grass is well adapted to the woodland soils, being little affected by shade. It remains green throughout the summer, making good pasture, and if properly cut and cured furnishes a nutritious hay. Alsike, or Swedish clover, supposed to be a cross between the white and red clovers, seems to be as well adapted to this climate and soil as is the native white clover. Crimson clover, though not cultivated to any very great extent, has been found to thrive well where given the opportunity. Red clover, one of the most extensively cultivated of the grasses, has been proved of high value. It makes a heavy growth, and is of great value for either hay or pasture. Japan clover has been found an excellent grass for rough and poor lands where others will not make a crop, and is an excellent thing for restoring waste and neglected lands.

Alfalfa has not been cultivated in the State to a very great extent, but where tried has proved of great value, and is being more largely planted with each recurring year, and will doubtless, before many more have passed, be numbered among the State's largest forage crops.

West Virginia abounds in native grasses, some of which are of great value, and all of more or less usefulness as food for stock. Foremost among these—after bluegrass and white clover already mentioned above—is the crab grass. It is really classed as a weed, because it has to

be contended with in the cultivation of other crops, but it is a useful and a palatable food for stock, and farther south is utilized for hay. It spreads rapidly where given the opportunity, as its lower joints take root when coming in contact with the ground, grows rapidly and is apt to smother out other and less tenacious grasses.

Broom-sedge grows on neglected land, and furnishes fairly good pasture while young and tender; sprouting crab grass, is an annual with smooth, coarse leaves of considerable value in food properties; wild millet is a perennial that grows in woodlands and along ravines; floating fox-tail, a perennial found in low, wet lands, is excellent for stock; meadow fox-tail, a perennial, is found on moist

lands; spear grass, a perennial, grows along woodland streams and on mountain slopes; reed meadow grass, a perennial, is a good pasture grass for wet lands, is well liked by cattle and yields considerable hay; rattle snake grass, a tall perennial, grows in marshes and ditches; meadow fescue, an upright perennial, is a valuable hay grass; Hungarian broom grass, introduced, is a strong growing perennial that has been found valuable for its drought-resisting powers and is excellent as a forage plant on dry, gravelly or sandy uplands; low spear grass, a low tufted annual, grows in waste places; woodland blue grass, a slender, smooth perennial, grows in thickets and open woodlands, and makes fine pasturage for stock of all kinds.

The Agricultural Possibilities of West Virginia.

By Howard E. Williams,
State Commissioner of Agriculture.

Some one has referred to the State of West Virginia as "The Land Overlooked," which in some sense may have been the case in the past, but the world has waked up to the realization of the fact that this State is "The Land Looked For," as the land of great and growing possibilities. As a land of unlimited coal, oil and gas, it stands at the head of the list, and the development of these vast natural resources is attracting thousands of men and millions of capital. But it is not of these inexhaustible sources of wealth that we will treat in this article.

The men who develop the coal, oil and gas, and convert into commercial products the splendid lumber resources of the State's large forest area must be fed while they work.

In round numbers West Virginia has 15,000,000 acres of area, some 5,000,000 acres of which is not adapted to agriculture, but has great value for the perpetual production of lumber and other forest products. Another 5,000,000 acres is and should be almost entirely devoted to grazing and live-stock production. Much of this virgin land in West Virginia, or about one-half of what is usually classed as farming land, has never been brought under cultivation, and much of it should never be.

The remaining 5,000,000 acres may be properly classed as farming land and much of it susceptible of a very high state of cultivation. The land area and production may be fairly summarized as follows:

Land Surfaces of West Virginia.

Total number of acres.....	15,374,080
Total acres in farms.....	10,026,442
Number of acres improved.....	5,521,757
Percent in farms.....	65%
Percent of farms improved.....	55%
Percent of total area improved.....	35%
Total number of farms.....	96,635
Average size of farm.....	104 A.
Total value of farm property.....	\$314,759,000.
Estimated increase in last five years.....	60,000,000.
Average value per farm, all farm property.....	3,255.
Average value of land per farm.....	2,755.
Average value per acre.....	26.
Estimated present value per acre.....	30.
Total value live stock.....	41,318,436.

Cattle	15,869,764.
Horses	18,583,381.
Mules	1,336,760.
Hogs	2,087,392.
Sheep	3,400,901.
Value of live stock not on farms.....	4,941,574.
Value of dairy products estimated.....	15,000,000.
Value of wool.....	762,247.
Eggs and poultry.....	5,872,193.
Percent of improved land cultivated.....	33%
Percent total area cultivated.....	10%
Total value of farm crops.....	40,374,776.
Average yield of corn.....	25 Bu.
" " " Wheat.....	12.3 Bu.
" " " Oats.....	17 "
" " " Buckwheat.....	16 "
" " " Rye.....	9.5 "
Average improved acres per farm.....	55%

The improved or cultivated acreage of the State may easily be doubled and it is not unreasonable to expect an increase of 50 percent in yield per acre of the farm crops, or one and a half times the total yield of the State.

These figures are taken from the last census report, and while they are variable from year to year, on the average they have been considerably increased during the last five years.

It is certainly possible to double the farm crops and raise the total value from \$40,374,776 up to \$80,749,552.

If the live stock of the State can double also, it would make a grand total of approximately \$165,000,000.

The most reliable figures obtainable show an actual farm population in this State of 407,039—approximately four people per farm, or one person for each 25 acres of farm land; about one and one-half able bodied men per farm of .34 acres, or about one man for each 70 acres of farm land.

Our valleys are becoming beehives of industry and this increasing mass of humanity must be fed either from the products of our own fertile soil or from the products of other lands which may be shipped to them. The possibilities are that the home production will not for years supply the demand, which is now far greater than the supply. This fact guarantees a home market at the very door of practically every farmer, gardener and fruit grower in the State.

Railroads are penetrating almost every section of the State and Millions of capital is pouring in to develop the vast natural resources. The higher wages paid by these enterprises are attracting many of the best young men away from the farms. The silver lining of this cloud is the fact that the more the men who leave the farms the better the opportunity for the men who remain. The reaction must come some time and it seems to us that it is already here, with the chances for profitable employment in favor of the man who stays on the farm rather than the man who leaves it for other employment.

Opportunities for advantageous investment in farming, grazing and fruit lands are numerous, investment which may be made to yield a handsome profit by intelligent care and cultivation. By reason of the great diversity of elevation, exposure and soil formation the lands yield themselves to the production of an almost endless variety of crops and plants, which may be utilized for human food and comfort.

All the State's soils are native, produced from the disintegration of the local rock formations, and varying from a thin non-productive sandy to an almost inexhaustibly fertile calcareous clay, the superior of which cannot be found anywhere.

The soils along the river valleys and larger creek bottoms are well adapted to market gardening and truck growing, for which they are destined to be much more largely used.

The rainfall in West Virginia averages about forty-five inches annually, and there is little danger of the lack of sufficient moisture for the production of normal crops.

The three leading crops, corn, wheat and oats, are grown in all the counties of the State, but they are very unequally distributed, largely owing to the great difference in climate and soil conditions. Buckwheat is profitably grown in many of the higher sections of the State and on the lower levels tobacco is grown quite successfully, especially in the counties of Cabell, Lincoln, Putnam, Wayne, Jackson, Wirt, and Mason, and it could be successfully grown in a much larger territory. The annual production of tobacco is many millions of pounds, and the area devoted to it will not likely ever extend above the Little Kanawha river or into the more elevated sections. Potatoes are grown in every county in the State and the production could easily be largely increased. No better quality of potatoes is grown anywhere. While they do well on all our productive soils, they are especially adapted to certain localities in some of the upland counties along the western slopes of the Allegheny mountains.

All the vegetables and truck crops known to the latitude of West Virginia can be abundantly grown almost anywhere in the fertile soil of the State, and especially on the alluvial bottom lands along the rivers and larger streams.

Fruit production has largely increased in recent years and that produced in some favored localities has long been noted for its excellent quality. The apple industry was first developed along the Ohio river from Hancock to Wayne county and in an early day found a market down the river as far south as New Orleans. Following the civil war some years the fruit industry was almost entirely neglected, but as early as 1880 the business began to attract attention in Hancock and Berkeley counties, and their nearness to good markets and their excellent shipping facilities probably had much to do with the early development of commercial orcharding in those counties. There are many other counties in the State fully as well

adapted to fruit growing and the development of the business is spreading in all sections, following the extension of shipping facilities. Many of the hill lands may be more profitably devoted to the growing of high class apples and peaches than anything else. Grapes do well everywhere, and pears, plums and cherries find a congenial home in every section of the State.

Prof. T. C. Johnson, in closing a fruit article, has this to say: "West Virginia fruit lands, developed and undeveloped, are abundant, her soils are fertile, her climate is ideal, her slopes and exposures are varied, her mountains and valleys offer the best atmosphere and soil drainage available anywhere, her transportation facilities are ample for twenty times the developed fruit area, and new roads are building constantly; her fruit is unsurpassed in quality, flavor, color, or keeping qualities, her orchards are most productive, her local markets are unexcelled, her business men are active, energetic and courteous, her horticultural society believes in accomplishing something. In short she is a great fruit State. Why not come to West Virginia and grow fruit—fruit that everyone delights to eat and all who see it are anxious to buy."

Among the most important possibilities of West Virginia is her splendid adaptation to the production of high class live-stock of every kind. This State has more square miles of blue grass territory than any other State in the Union and its excellent pasture possibilities are not half developed. The State is finely adapted to the production of horses, cattle and sheep, while in many localities hogs may be profitably grown, and the poultry industry finds especially favorable conditions here.

Abundant blue grass pastures and the purest of water are found nearly everywhere, making the production of the very best horses possible. Some sections of the State have long been famous for the production of very high class saddle and driving horses and in recent years much attention has been given to the raising of improved draft horses with great success.

The most important live-stock industry has for many years been the production of beef cattle. Our climate, water and grass produce a superior quality of beef. Not much grain is fed and many cattle are wintered on hay alone. Many fat cattle are sent to the market direct from the blue grass pastures, and they have been exported to foreign markets with success. Increasing attention is being given to the improvement of beef cattle, and no State can show better specimens of pure bred cattle than this.

Until recently the dairy industry had not received much attention, but with the increasing population and the development of a home market dairymen are rapidly increasing and improving their herds. With milk selling at ten cents a quart and an unlimited demand for good butter right at home, the dairy industry must rapidly increase in importance.

West Virginia is especially adapted to sheep raising, and the time must soon come when this industry will be greatly extended. Every county in the State furnishes good opportunities for sheep raising and the number now in the State, about a million, might profitably be quadrupled. There is no other kind of live stock that will pay a larger profit than sheep intelligently handled. The mutton breeds do best in some sections of the State, while others, like the Northern Panhandle counties, produce the finest of fine wool and have long been famous for their fine flocks of merinoes and their related breeds. West Virginia is the natural habitat of the sheep, with all the conditions favorable for its successful production, and

millions of sheep should be grazing everywhere on its thousands of hills.

We are just beginning to realize our own agricultural, horticultural and live stock possibilities and if West Vir-

ginia was ever "the land overlooked" from this time forward it will be "the land looked for," and opportunities for profitable development of that land will not be hard to find.

West Virginia, the Land of Trees and Vines, Abounding in Fruit Everywhere.

By Prof. T. C. Atkeson,

Former Dean of the West Virginia College of Agriculture, Now Connected with the State Department of Agriculture, and Master of the State Grange.

When the first white men crossed the mountains and penetrated the trackless forest that covered every hill and vale from one end to the other of the present State of West Virginia they found a great variety of wild fruits growing abundantly on every slope and hill top and along the streams of every section. Grape vines grew everywhere and wild grapes hung in ripening clusters from many a vine-supporting bough throughout the frosty weeks of the autumn.

Everything in nature demonstrated and proclaimed this the native home and congenial habitat of tree-fruit and from vine and bush and shrub many grapes and berries were gathered by men and animals. The hardy pioneers early planted apple, peach, pear, plum and cherry trees about their humble cabins, which in an incredibly short time yielded fruit after their kind. These early orchards were almost entirely seedlings, which produced many varieties of unimproved fruit, some of which was good, but much of which was indifferent or very bad. Single individuals and small groups of these pioneer apple trees may be found here and there throughout the State, still healthy and in bearing, that are more than a hundred years old.

The climate, the soil and the topography, all combine to make West Virginia the "promised land" of the orchardist and fruit grower. Nature has done its best and our latent possibilities for leadership in fruit production are only awaiting the developing hand of man, who has only recently found this goodly land of promise.

Previous to the middle of the last century very little effort had been made to improve the fruit of the State, budding and grafting being an unknown art among our farmers. There was practically no market for fruit of any kind, except for that produced on a narrow stretch along the Ohio river, where apples were grown in an early day and shipped down the river in the crude boats of that day and marketed as far south as New Orleans.

Following the Civil War, and the conditions produced in the South by it, this market entirely disappeared and many of the old orchards were cut down and the land utilized for the growing of other crops.

Along in the fifties, and possibly earlier in some localities, some attention was given to improving the varieties of fruit, and the art of budding and grafting was practiced to some extent. A few nurseries were established in the State and enterprising outside nurserymen began to sell their stock among the farmers who were planting out small orchards for home supply. Much of the stock sold was fraudulent and proved to be untrue to name and of little value. By the nurserymen themselves and by law all this has been corrected until now the

purchaser of nursery stock may buy with reasonable assurance that he is getting what he pays for.

Commercial orchard planting began in a small way soon after the Civil War in some favored localities, and gradually increased until about 1890, when the splendid orchard possibilities of the State began to be really appreciated. Since that time, and especially since the beginning of the present century, West Virginia has been attracting the attention of commercial orchardists from one end of the country to the other.

The improvement of transportation facilities has had much to do with the extension and development of our fruit industries. The number of fruit trees of bearing age in this State in 1910, was, in round numbers, 7,000,000, and under bearing age 5,000,000, making a total of 12,000,000. A careful estimate places the number at this time not below 15,000,000, and planting continues with increasing ratio. Some of the largest and most profitable apple and peach orchards in the whole country are in West Virginia, and the time is not far distant when this State will rank at the top of the fruit producing States of the Union.

The principal orchard development has been in the Eastern and Northern Panhandle counties, but commercial orchard regions are being developed in many of the interior counties. The edge and points have been touched, but the great central portion is almost an unexplored territory, awaiting the hand of development. The superiority of West Virginia's fruit in size, flavor, color and keeping qualities is demanding attention of dealers and growers in many parts of the country. A few years ago our apples and peaches were not known outside of the immediate localities where they were grown. But this is all changing. The buyers from east and west are after our fruits. The day is past when fruit can be discriminated against, because it grew south of Mason and Dixon's line.

The Grimes Golden apple originated in Brooke county, West Virginia, on the farm of Thomas Grimes, near Wellsburg, and nowhere is it more highly developed than in this, the State of its nativity.

In a public address a few years ago, Mr. H. W. Collingwood, editor of the Rural New Yorker, said of this splendid apple: "West Virginia has developed some great men and has given great wealth to the world, but it is doubtful if any other product of her soil is more worthy to be given to the world than the Grimes Golden apple. The origin was humble enough. Over a hundred and fifty years ago an apple seed was dropped on a West Virginia farm. We do not know whether it was planted intentionally, whether it was dropped by some wandering bird, or whether it fell from some tree by chance. That does not

matter, for the divine instinct and purpose which from the beginning has willed that the good shall survive, guarded the seed and nursed the seedling. The little tree grew unmolested to fruitage. There was that within it which corresponds to genius and unquenchable ambition born in the heart of man. It could not be destroyed."

Famous as West Virginia is for her high class apples, it is not upon these alone that she depends for her fair name in horticulture. West Virginia is a pioneer in peach growing. An old lease granted by George Washington to William Bartlett, dated March 18th, 1774, and recorded in Berkeley county, provides for the planting of one hundred peach trees. This is probably the oldest orchard record in the State, but it is by no means the first planting of either apple or peach trees in what is now West Virginia. It has gradually grown to be one of the leading peach growing States in the Union. Our favorable climate, soil and elevations must logically produce this result. Our high grade peaches find a nearby market in all the large eastern cities, and they have found their way to the markets of London and other European cities.

Peaches are grown, more or less successfully, in every part of the State, but certain localities are especially adapted to their production and it is in these localities

that commercial peach growing is being largely developed. "The peach succeeds best in West Virginia on elevations or exposures least likely to be affected by sudden changes of temperature during the winter and early spring months. The hills and mountains afford these conditions and the fruit grown upon them develops large size, firm texture and fine flavor. Some of the largest and most successful peach orchards in the world are located in the Allegheny mountain regions of the State."

There is no fruit grown anywhere in the latitude of West Virginia which may not be grown with splendid success somewhere in the State, and tree-fruits may be grown everywhere. There is no State in the Union where the possibilities for development of the fruit industry are greater or with more inviting conditions.

It is here

"Some trees their birth to bounteous nature owe,
For some without the pains of planting grow."

And here also

"The wild grapes by the river side,
And other wild fruits trailing low,
The table of the woods supplied."

The Live Stock Industry in West Virginia.

By E. W. Sheets,

Professor of Animal Husbandry, West Virginia University.

That West Virginia has a live stock industry no one familiar with the State will deny. As to its future there can be but little difference of opinion. The natural conditions of the State have contributed to making the industry profitable in the past; and the developments of the future are sure to make it even more remunerative to a larger number of people.

The State has a total area of 16,374,080 acres, about 66 per cent. of which, or 10,026,442 acres, is classed as farm land. About one-half of this farm land is improved, or about 33 per cent. of the total area of the State is classed as improved land, leaving the other two-thirds as hilly, rocky or even mountainous, and too rough for profitable cultivation. Practically two-thirds of the 10,000,000 acres of rough and mountainous land which is now idle can be utilized for pasture purposes for various kinds of live stock.

The average farm in West Virginia is composed of 103.7 acres, of which 56.6 acres is improved. Upon this average farm, according to the census of 1910, were found 9 sheep, 8.8 cattle, 3.0 hogs and 2 horses and mules or a total of 22.8 head of live stock, exclusive of poultry.

Among the natural conditions of the State which are usually regarded as essential to a profitable live stock industry are cheap lands upon which palatable and highly nutritious pasture grasses may be grown, suitable climatic and soil conditions and facilities adequate to put the products of the industry on the market at a reasonable cost. In all of these essentials West Virginia is peculiarly blessed. That they will be found better anywhere in the United States or Canada is doubtful. The land is rolling, hilly, or even mountainous, affording those very conditions that live stock so much love. The blue grass pastures are excelled by none and may be greatly improved by care. Blue grass grows freely throughout the entire

State. In many sections it grows so freely that it even comes out on cut-over land. The largest portion of the State is of a limestone formation, rough and rugged in sections, favored with fertile bottom land where there are densely matted and luxuriant blue-grass sods. Water is abundant, gushing out at the base of the hills, flowing down the ravines unharmed by contaminating influences. The seasons are mild and open, so mild and open that stock can graze on the pastures during the greater part of the year. The climate is so moist that the grazing is succulent during practically all of this time. Forage and cereal crops can be grown in the small valleys and on the gentler slopes in abundance for winter feed, thus affording live stock and live stock products for the market at all seasons of the year with the minimum expenditure for feed from other States.

The climate of the State in summer is not so hot as to be harmful to stock at that season, which cannot be said of the States farther south. The cold does not cut off the pastures in the winter season of the year as it does farther north. The climate is not so dry as the western ranges where the grass becomes parched. The protection needed for stock is easily furnished winter and summer.

A large area of the State can never be made into first class plow land. Much of the land that is now plowed should be turned back into pasture, for who can tell how much of our precious treasure, soil fertility, has already passed down our streams? The fertility of the land must be maintained, and no better way has ever been devised than by the keeping and feeding of live stock.

The public highway is and will continue to be for many decades to come a limiting factor of our agricultural development and welfare. Since live stock are usually considered as machines for reducing farm crops to a more concentrated market product, they bring the markets

nearer the source of production, thus putting our crops on the market at a minimum cost. For a series of years, with our poor initial transportation facilities, live stock have returned a greater total profit than could have been secured from marketing crops in their original form. By feeding the ordinary farm crops to live stock prices higher than the average market quotations have been obtained for these crops.

The future of the live stock industry in the State seems very promising indeed. Investigation has proven that hungry man will not forsake his meat to any appreciable extent. On the contrary, modern methods of canning and cold storage have brought the shipments of meats and live stock products to such a high degree of certainty and perfection that its consumption has greatly increased. City dwellers are large consumers. During the last ten years the rural population has increased 20 per cent., while the urban population made a gain of 66 per cent. An export trade has grown from almost nothing to immense proportions during a comparatively short time.

While the demand for live stock products has greatly increased, the systems under which they have been produced have largely vanished. Twenty years ago millions of acres of western range were as free as the air and individual ranchmen and cattle companies by the hundreds grazed their flocks and herds by the tens of thousands.

These flocks and herds slowly grazed their way from one feeding ground to another, and after the herd was once established the cost of herding was about all it cost while production went on year after year. These conditions have changed. The vast ranges have been surveyed, sold and fenced and passed out of Government ownership to that of individuals. The evident readjustment must come, in fact is here now, through a reverse of the farm system. Instead of one man marketing 5,000 head of stock a year, there will be 5,000 owners each of one beef or mutton or its equivalent per year. Some farmers will produce more, but the great reliable, steady flow of live stock and live stock products will ultimately go to the packing houses in a vast stream made up of innumerable small branches. Under these conditions mutton, beef, dairy and other live stock products will be produced on what is now going to waste, and with the care which is usually given small units each will show increased profit.

West Virginia with its cheap land and small farms, hilly or mountainous as they are, richly covered with abundant pasture grasses, bids fair to be the center of a profitable live stock industry. Thus it is that the people of West Virginia have a goodly heritage and in truth can sing with Wordsworth:

Not undelightful are the simples charms,
Found by the grassy door of mountain farms.

The Development of Rural Life in West Virginia.

By C. R. Titlow,

Director of Agricultural Extension.

A stranger travelling by rail through the State of West Virginia would see thousands of oil and gas wells, hundreds of coal mines, and a large number of lumber mills. He would also notice that the valleys along the streams are narrow, the hill-sides very steep, and that a considerable area is apparently waste land.

His observations would probably lead him to conclude that the greater portion of the State is given over to mining and lumbering and that a very small area is used for agricultural purposes.

It is true that there is considerable waste land in the State, as far as agriculture is concerned, and it is also true that hundreds of thousands of acres still remain practically undeveloped. But, regardless of these facts, agriculture is of greater importance to the State than are its natural resources. The taxable wealth of farm land and buildings forms about one-third of all the real estate values and nearly equals the value of the public utility companies of the State. The farms of the State employ twice the amount of capital and twice the number of men employed by the manufacturing interests, and the total products from the farms equal the products from the oil and coal fields. The greater portion of the farm land is hilly, but the soil, if properly tilled, is wonderfully productive.

A decade ago the farmers of the State were following the time honored agricultural methods of a previous generation, and little real progress was being made. Of course, here and there a wide-awake orchardist, dairyman or live-stock breeder had realized that, since conditions for production and marketing had radically changed, farming methods must likewise change; but no general, State-wide



Discussion of Points to be Considered in Seed Selection.
Three Boys and District Superintendent.

movement for better agriculture had made its appearance at that time.

It was in 1907 that the College of Agriculture of West Virginia University first awoke to a full realization of the fact that the college owes a service to the farmers throughout the State no less than to the students who are enrolled in the college classes. For the furtherance of their idea an Agricultural Extension Department was

established, to carry the teaching of better agricultural methods and practices into every county and district of the State. Definite plans of work were laid out and the agricultural extension schools held in several counties that year were, it is claimed, the first extension schools ever held in the United States.

The newly organized department was, however, seriously handicapped by a lack of money and it was not until 1911 that the work was placed upon a permanent and thoroughly organized basis. The early appropriations for extension work were small, but they were sufficient to lay the broad foundation for later development and to actively carry on several lines of work that have since grown to large proportions.

The Junior Farmers.

One of the earliest forms of extension work to be developed was the organization of Boys' and Girls' Agricultural Clubs. Thousands of boys and girls throughout the State have grown corn, potatoes, tomatoes, and poultry under the supervision of, and spurred on by, these agricultural club leaders. Many a boy has demonstrated to his father that certain changes in his farming methods would mean bigger crops and bigger profits. In 1913 the widening scope of the club work made it necessary to separate the boys' clubs from the girls' clubs and to appoint State leaders for each. The attention of the girls is now directed more to the domestic science and home-craft phases of rural living, although plenty of work with the soil is still provided in caring for the one-tenth acre of tomatoes or other vegetables which each member must grow.



Corn Club Members in a Judging Contest
at a Country Corn Show.

In order to make the club work more effective, it has been found best to have local leaders to constantly advise and encourage the members throughout the season. In many counties this has led to an arrangement whereby district supervisors of schools are employed co-operatively by the local school boards and the extension department to spend the summer months in supervising the club work. In this way the club work becomes a real part of the child's education, and not infrequently the club work proves to be the bond of sympathy that links the school and the community into a close relationship.

In 1914 the average yield of the 115 corn club boys who made the best acre production record was 68.8 bushels.

The two boys who stood highest, each produced 133 bushels of corn on an acre of land. A conservative estimate of the value of the products of the corn, potato and poultry clubs in 1914 would not be less than \$20,000. Thirty shows were held and approximately \$4,000 was given by the various counties as premiums, in addition to paying the expenses of one or more boys from each of these counties to the Prize Winners' Course given at the College of Agriculture. In every community leadership is being developed, men in every walk of life are holding a higher respect for farm work, and the Junior Farmer is being recognized as the kind of citizen of which the State may be justly proud.

Practical Schools for Farmers.

One of the best organized forms of extension work consists of the series of extension schools conducted each year in many of the counties of the State. At each of these schools two or three instructors spend four days in giving lectures and demonstrations in soil fertility, farm crops, live-stock production, dairying or household economics, to regularly enrolled classes of farm men and women.



Farmers' Week Students.

Many sections can point very definitely to permanent community improvements that have had their inception at extension schools. At one school this year a joint order was made up for three carloads of fertilizer materials, to be home mixed. At another school a carload of improved grain seeds was ordered. In some localities pruning and spraying have become the rule instead of the exception, through the efforts of the instructors in horticultural extension. In several places pure-bred sires have been purchased co-operatively and are being used to build up the native herds. Co-operative dairies have been established, limestone crushing outfits have been installed, new and improved crops have been introduced, hundreds of silos built, and dozens of other tangible evidences of the good effects of these schools might be mentioned, to say nothing of the increased knowledge of improved practices and processes which every farmer puts into use on his own farm and which in the aggregate produce even bigger benefits than the more apparent results above mentioned.

It is evident that this type of extension work has come to stay. The requests for schools are rapidly increasing from year to year. During 1914-'15 twenty-nine schools were held and several applications had to be refused.

account of lack of sufficient instructors. Every effort will be made to meet the demand for these schools as rapidly as possible, and ultimately it is hoped to hold at least one school in each county each year.

Farmers' Institutes.

The extension schools are, in many respects, an outgrowth and development of the farmers' institute, which has served such a long period of usefulness throughout the various agricultural States, and which still flourishes in West Virginia. Two years ago the farmers' institute work was taken over by the Extension Department, and last year 115 two-days and 14 one-day fall or regular institutes were held, requiring the services of forty or more men and women to give lectures and demonstrations. Be-



An Overflow Meeting at a Farmers' Institute.

sides the regular institutes held during the autumn there are several hundred institutes, of one session each, held by county agents and other agricultural specialists who are a part of the agricultural extension staff of the State. At these meetings much emphasis is placed on the practical phases of farm work. The department usually sends to each of these meetings a practical farmer who has had exceptional experiences, together with a college instructor, thus making it possible to give in a few lectures and demonstrations the most scientific and up-to-date farm practices on subjects of special importance to the local community. In a large number of farming communities the institutes are looked forward to as a regular annual event, and a single audience sometimes numbers 500 to 600 or even 1,000 persons.

Interesting the Masses.

In the earlier days of the Extension Department it was necessary to reach a large number of people in a short space of time and at a limited expenditure of money and talent. For special work of this kind the special agricultural train served the purpose well. If it happened to be a live-stock special, the animals needed for illustrative purposes were loaded into a baggage coach and with a full complement of lecturers the train started out, stopping at every station and delivering lectures, first inside the coaches and later at the door of the baggage car. If a horticultural section was to be traversed, the equipment would consist of displays of fruits, fruit trees, insecticides, fungicides, pruning and grafting tools, spray machinery and like apparatus of an instructive nature. These trains never failed to attain the end sought; namely, to arouse interest in a particular line of agricultural

endeavor and to implant certain fundamental principles concerning that special kind of work.

Helping the Fruit Grower.

The horticultural products of West Virginia have become one of its greatest agricultural assets. Fruit lands, developed and undeveloped, are abundant. The soils, climate, and atmosphere are almost ideal for this kind of agricultural production. The quality, flavor and color of our fruits can hardly be surpassed. We have now almost five million apple trees that are bearing fruit and about three million that are from two to eight years old.



The Specialist Giving a Demonstration in Spraying.

The largest single apple orchard consists of five hundred and sixty acres. In addition to the large commercial orchards, we find practically every farmer supplied with a fair sized producing orchard.

The necessity of using the spray pump and the pruning knife was slow to gain recognition, and so for several years the spring program of the Extension Department included a vigorous spraying and pruning demonstration campaign. Whenever a call comes for a demonstration of this kind a man goes directly to the orchard, dons a pair of overalls and actually goes through the various spraying or pruning operations, at the same time answering questions and calling attention to pertinent points. By this demonstrational pruning and spraying a renewed interest has been made manifest in orcharding, and hundreds of orchards that for years had not produced enough marketable fruit to pay the taxes on the land have become sources of considerable income to the owner.

The Farm Women.

The problems that confront the farm woman in the home and in the community life have been receiving special attention in the past two years. In addition to the home-economics extension schools already mentioned, many farm women's clubs have been organized to carry on regular instructional work and to provide the social activity so often lacking in rural communities. Many clubs have organized special work in cooking, sewing and other household arts.

Women instructors have given special lectures on home economics at each farmers' institute, and have organized the women into study or women's clubs. Correspondence courses are provided for these clubs during the winter months. The work is creating a great demand for better rural homes.

Girls' Clubs.

The girls in several counties of the State have been organized into clubs for garden and canning work. Each

club has its officers and adult leader and over all the clubs of a county is a county leader who spends practically all her time in organizing, directing and supervising this work. Monthly meetings are held for each local club and plans for the betterment of their work are discussed.



A Girls' Club Canning Demonstration.

Annual exhibits are held in each county and hundreds of premiums are awarded. A short course in Home Economics is given at the University for the winners in the various counties. The work has not only been profitable to the members of the clubs in a financial way, but it has renewed the girls' interest in their rural homes and inspired them to make preparation for efficiency in home work.

Cooperating with the School.

The idea of gradually introducing agriculture into the schools of the State has been consistently carried out in cooperation with the State Department of Free Schools. One man gives his entire time to outlining courses of study; preparing monthly bulletins on agriculture for the use of the teachers in the rural schools; encouraging boards of education to put agriculture in the high school curriculum; and in conducting correspondence courses and courses at the University for the training of teachers of agriculture to take positions throughout the State. A large majority of the high schools have added agriculture to their courses of study within the past two or three years.

The County Agricultural Agent.

In extension work it early became evident that in order to make continuous progress in any particular community it was necessary to have a man on the ground who would be known as a local resident, but who would at the same time have some official connection with the College of Agriculture. Thus there arose the county agricultural agent, a man of training and experience who is permanently located in a county for the sole purpose of furthering the agricultural interests of that county. West Virginia already has some twenty of these county agents and a number of other counties are arranging to secure agents in the near future. In the counties where agents of this kind have already been at work for two years or more, the effects in increased production and increased agricultural interest are quite evident. It is not un-



Demonstrating the Building of a Home-Made Silo.

common for an agent to save the farmers of his county enough money on the purchase of fertilizers, feeds, seeds, etc.,—through local dealers—to more than pay his own salary, to say nothing of savings arising from the use of better types and grades of livestock; the practice of better fertility and cropping methods; the introduction of better seeds; the replanting and management of farms; the building of farm water systems, drainage systems, and the dozens of other activities that make the agricultural agent the busiest man in the county.

What County Agricultural Agents Did in 1914.

Fifty counties of the State had agents throughout the entire year 1914, and eighteen counties had agents for four months or more. The following will indicate some of the activities of these men:

Miles traveled by agents	65,641
(much of distance on horse back)	
Number farm visits	3,736
Number meetings held	1,143
Attendance at meetings	62,432
Newspaper articles prepared	459
Letters sent out	27,709

Results in Soil Improvement Demonstrations.

Drainage (Approx.)	539	acres tiled.
Lime	10,986	acres treated with lime
Phosphorus	9,408	acres treated with acid phos.
Manure	4,284	tons saved by extra care
Legumes	2,205	acres to be turned under
Other cover crops	6,163	acres to be turned under

Results with Field Crop Demonstrations.

Corn	987	acres at average of 51 bu. against county average, 25 bu.
Potatoes	198	acres at average of 81 bu. against county average, 45 bu.
Orchard crops	53,100	trees given attention.
Alfalfa	697	acres harvested.
Alfalfa	1,070	acres seeded.
Cowpeas & Soy Beans	761	acres harvested for hay or seed

Results with Livestock Demonstrations.

Silos	302	filled for the first time.
Pastures	915	acres treated

Purebred Sires— 80 introduced
 Dairy Cows— 171 under test scales and Babcock tester
 Cattle & Cows— 4,604 fed modified economical ration
 Poultry — 187 poultry houses remodeled
 Of 1,404 well hogs treated with cholera serum—saved 96%
 Of 946 sick hogs treated with cholera serum—saved 73%

A recent Act of the Legislature, which enables county courts to appropriate money for part of the salary of county agents, places this work on a permanent basis and is already being taken advantage of in several counties.



A Potato Spraying Demonstration at a Boys' Club Meeting.

The following will give an idea of some of the lines of work carried on by the Extension Department during a period of six months:

From July 1, 1914, to December 31, 1914.

Number of two-day institutes.....	115
Number of one-day institutes.....	14
Total attendance, men.....	28,835
Total attendance, women.....	21,936
Agricultural Extension Schools.....	28
Average attendance each day (Approx.).....	100
County agricultural agents employed.....	21
Boys' Club district agents.....	8
Boys enrolled in clubs.....	4,811
Girls' Club district agents.....	9
Girls enrolled in clubs.....	861
Boys' county agricultural shows.....	34
Girls' county agricultural shows.....	5
Special meetings held.....	52
Attendance.....	6,416
Farm women's clubs.....	14
Correspondence course students.....	164
Fair exhibits (viewed by visitors, approx.).....	65,000
Agricultural news notes sent to all papers of the state, Bulletins published.....	156,000
Number of persons reached by bulletins and circulars.....	28,500

In addition to the above mentioned lines of regular work might be mentioned the hundreds of special meetings for which lecturers are being constantly supplied; the elaborate and very instructive fair exhibits show at many county fairs each season; the special alfalfa demonstration plot work, which has introduced alfalfa into many sections where it was formerly unknown; the hundreds of thousands of bulletins, circulars and newspaper articles

of an informational nature; the big annual "Farmers' Week" held at the College for the benefit of farmers from all parts of the State; and the special conference of ministers and others interested in country life development.

All branches of the extension work are rapidly growing and the facilities of the department are constantly taxed to the limit. It has been stated in official circles that West Virginia has the "best organized extension department



Demonstrating How to Dress a Mutton.

in the United States." One of the secrets of the success of this organization is to be found in the policy of liberal cooperation with all existing local agencies and organizations for the advancement of rural life. Thus the granges, the county Y. M. C. A.'s, the boards of trade, the bankers' associations, the women's clubs, the fair associations, and the entire common school, high school and normal school systems are kept in touch with the extension department and are from time to time disseminating information which emanates from the College of Agriculture.

National Aid in the Work.

At the present time less than half of the funds for carrying on this work are provided by State legislative appropriations, the United States Department of Agriculture and the Smith-Lever congressional appropriation supplying the remainder. The passage of the Smith-Lever Act by Congress, May, 1914, has made a more permanent and efficient plan for the extension work of the State. This Act carries an appropriation to the State of \$10,000 per year, with an increase such that the sum thus received in 1915-1916 will be \$22,071, and in 1916-1917, it will be \$32,130 provided a sum equal to the increased appropriation has been appropriated for that year by the Legislature of the State, or provided by State, county or local contributions from within the State. This increase continues until 1922-1923, when the total sum possible to receive from the Smith-Lever Fund will be \$92,848.

The agricultural awakening that has followed the comparatively recent establishment of the agricultural extension department at West Virginia University is only an indication of the rapid rural development that may be expected in the future. There is no good reason why the average West Virginia farm, rightly managed, should not yield a comfortable living and a satisfying life, and the Agricultural Extension Department aims to push forward to this ideal as speedily as possible.

Truck Farming in West Virginia.

Given good soil, favorable climate conditions, convenient market and proper transportation facilities, and there is probably no other phase of agricultural life that presents so many attractions from the standpoint of profits as does the growing of truck. In numerous sections of West Virginia the lands are specially adapted to the production of vegetables of the kind ordinarily included in the term "truck," in all the towns there is a demand for such things that causes them to bring good prices to the grower, while the facilities for reaching most of such towns from wide areas of trucking lands are all that could be desired. So little trucking is done in the State that millions of dollars are sent out annually to purchase supplies from other States, thus losing to the people at large a tremendous amount of money each year that should be kept at home. There is not a coal mining community in the State but furnishes a considerable market for market garden produce, most of which must be brought in from outside the limits of the State. And there are few coal mining communities that have not, within easy reach, bottom lands that could with proper cultivation be made to produce largely and lucratively of the things thus purchased elsewhere.

The largest bodies of trucking lands found in the State are those lying in the bottoms of the larger streams—the Ohio, the Great Kanawha, the Little Kanawha, the Monongahela, etc. The Ohio river is edged by broad bottoms almost the entire way from the northern extremity of Hancock county to the mouth of the Big Sandy river at the State's extreme southwestern reach, and these bottoms are covered with soils of a character that makes them almost ideal for trucking purposes. These soils, in a general way, are the Huntington loam, Huntington fine sandy loam, Wheeling gravelly loam, Wheeling sandy loam, Wheeling fine sandy loam, Wheeling silt loam, Wheeling silty clay loam, Wheeling fine sand, Holston fine sandy loam, Holston silt loam, Holston silty clay loam, Moshannon silt loam, Huntington silt loam, Huntington silty clay loam, and others less well known. These loams prevail over several hundred thousand acres in the counties bordering the Ohio and Kanawha, and extend up the Guyandotte valley into Lincoln county.

All the way down the Ohio through West Virginia territory trucking is carried on to a greater or less extent, the largest gardens being in the neighborhood of Wheeling and Parkersburg. Every kind of vegetable known to table use and capable of being produced in the climate of the upper Ohio valley is raised in these gardens and sold almost within sight of the point of production. The soils are especially well adapted to the production of water melons, and no melon that reaches the market has a greater popularity than that grown in the counties of Wayne, Cabell, Mason, Jackson, Wood, Pleasants, Tyler, Wetzel, Marshall, Ohio, Brooke and Hancock.

From end to end of that portion of this valley that lies within West Virginia territory it is well served with transportation facilities, being traversed all the way by railway lines, and for considerable distances in a number of sections by electric trolley lines carrying into nearby towns and cities.

As with the Ohio bottoms so, to a less degree, with those bordering the Great Kanawha. They are broad, level, fertile, and penetrated for their entire length by railroad lines that furnish easy access to the markets. From Charleston two electric lines reach for a good many miles up and down the valley, bringing the markets of that city within easy reach of the truck farms being operated in that territory.

The same things, with some variation to suit the particular case, may be said of the bottom lands along the other rivers of the State. All have rich soils well adapted to the production of trucking crops, and it is but a question of time when they will be utilized to a much greater extent than they are at present. Nor are the lands available to trucking confined to the bottoms along the various rivers. They are to be found along the courses of innumerable creeks, lying in many instances in close proximity to mining towns that would furnish ample markets for everything edible that could be produced upon them.

Recently the miners and others living along the creeks in the vicinity of mining operations have taken to planting gardens and raising vegetables for their own tables, and in a few instances the production is such as enables them to sell to their neighbors, and even to the markets. But these latter instances are quite rare, and the mining communities are for the most part furnished with vegetables from gardens beyond the limits of the State.

But even the combined area of rivers and creek bottoms does not complete the whole of West Virginia's excellent trucking lands. On the plateau that forms one of the State's grand topographical divisions are found fertile soils that are as well adapted to trucking, especially in some of its phases, as any found in the bottoms. And even on the mountain sides soils prevail that are made to produce prolifically wherever cultivated with industry and intelligence. The limestone lands of the Eastern Panhandle yield plentifully of all kinds of truck crops, and they lie within such easy reach of the city markets of the East that their husbandmen may well be independent of the local markets.

The farmer who will combine truck growing with raising poultry and fruit will find many opportunities in West Virginia for making a good living for himself and family and at the same time laying aside a little money each year against the proverbial rainy day. If to these he adds the care of a few cows and the production of a little milk and butter for sale, he will find his savings increasing still more rapidly.

In fact, there is not a county within the borders of West Virginia that is wanting in good trucking soil, and most of them are so conveniently located with respect to markets that the selling end of the business is easily cared for.

In all sections, except, perhaps, in those lying close about some of the larger cities, the price of land is comparatively low, and most of it can be secured upon terms that the industrious and intelligent farmer will find easy to meet. With the general improvement in trucking conditions that are sure to come, with the increase in demand that the rapid growth of the State will naturally bring, these prices will increase from time to time, never being so low again as they are now.

West Virginia's Share in the Appalachian Coal Basin.

West Virginia has more extensive coal deposits than any other State of the American Union.

It lies in the heart of the Appalachian coal system, which is the most extensive contiguous coal formation of the known world, and within its borders bituminous coal exists in greater quantity and higher quality than in any other section known to geology or industry.

Professor Edward Hitchcock, in his well known work on the "Geology of the Globe," estimates this Appalachian coal field to be 100,000 square miles in area. Some authorities have placed it at 80,000 square miles; Professor William Barton Rogers estimated the production area at 63,000 square miles. Writing of it this last named authority said: "It possesses a length of 875 miles, and a maximum breadth, between its eastern outcrop in Southern Pennsylvania and its western edge in Northern Ohio, of about 180 miles. It extends from Northern Pennsylvania to Middle Alabama, parallel with the Appalachian Mountain System, the axis of which lies just west of it. Its coals are better than those of any other field in America and, save anthracite, are of every kind necessary to the arts and manufactures."

Professor I. C. White, State Geologist of West Virginia, defines the Appalachian coal field thus: "Beginning near the northern line of Pennsylvania, latitude 42, longitude 77, it extends southwestward through West Virginia, Southeastern Ohio, Eastern Kentucky and Central Tennessee, ending in Western Alabama, latitude, 33, longitude, 88, 900 miles from its northeastern terminus."

In the reports of the United States Geological Survey the area of this field is divided among the States thus:

West Virginia	17,280	square miles.
Pennsylvania	15,800	" "
Ohio	12,000	" "
Kentucky	10,300	" "
Tennessee	4,400	" "
Alabama	8,500	" "
Georgia	167	" "
Virginia (Southwest)	1,850	" "
Maryland	510	" "
Total area	70,807	" "

Of the actual coal area as shown above West Virginia has 1,480 square miles more than Pennsylvania; 5,280 more than Ohio; 6,980 more than Kentucky; 12,880 more than Tennessee; 8,780 more than Alabama, 15,430 more than Southwest Virginia; 16,770 more than Maryland; 17,113 more than Georgia.

The best authorities give the following as the percentages of workable coal in these various States: West Virginia, 75 per cent; Pennsylvania, 75; Ohio, 70; Kentucky, 70; Tennessee, 47; Alabama, 44; Georgia, 14; Virginia, 80; Maryland, 80.

The productive area in these States is therefore as follows:

West Virginia	12,930	square miles.
Pennsylvania	11,850	" "
Ohio	8,400	" "
Kentucky	7,200	" "
Tennessee	2,068	" "
Alabama	3,740	" "
Georgia	24	square miles.

Virginia (Southwest)	1,480	" "
Maryland	408	" "
Total workable area	48,100	" "

It will be seen from these figures that West Virginia has 27 per cent. of the workable area of this immense coal field.

Shape of the Appalachian Coal Field.

The Appalachian Coal Field has been described as lying in the form of an immense trough, the sides of which dip from the eastward or southeastward heights to the northwest, and from the northwest to the southeast, meeting on a common axis between the two extremities. The eastern and western edges of the field, though running nearly parallel midway of their length, gradually approach each other as they reach northward until they close up the intervening space and come together near Wellsborough, in Tioga county, Pennsylvania. The same kind of convergence takes place southward, the two edges coming together near Tuscaloosa, Alabama, forming there the southern rim of the trough, or basin. A straight line from the northern to the southern extremity of this field will be found to be 900 miles in length, and will extend through the trough at its lowest line. Of this line, or axis, Professor I. C. White, the well known geologist, has said:

"The central or deepest portion of the Appalachian basin, or geosyncline, enters West Virginia from Greene county, Pennsylvania, at the southwest corner of the latter State, and, crossing western Monongalia and eastern Wetzel counties, continues on through the State in a general southwest course across eastern Tyler, western Doddridge, central Ritchie, Wirt and Jackson, cutting eastern Mason, western Putnam and central Cabell to enter Kentucky from southern Wayne, ten miles above the mouth of the Big Sandy. Where the axis of this great basin enters the State, and on to the southwest as far as Doddridge county, at least, the Pittsburg coal is buried to a depth of 1,300 to 1,500 feet under the highest summits, or say 100 to 150 feet above tide; but from Doddridge county to the southwestward the basin begins to rise, and at the Kentucky line the Pittsburg coal overlooks the Big Sandy waters at an elevation of 800 feet above tide, in the deepest part of the trough. If we go up from this trough or basin in a northwest direction, we shall find that this central line of the general basin of the strata rises to the northwest at the rate of 30 to 75 feet to the mile, interrupted occasionally by the low anticlinal folds, until the last of the coal measure rocks pass into the air from Southeastern Ohio. To the southeast from the same center of the trough line the general basin is traversed by a series of folds which get steeper and higher (but not deeper) until we come to the eastern boundary of the West Virginia coal fields at the most eastern ridge of the Allegheny mountains."

Early Exploration of the Field.

The earliest mention of the coal deposits of what is now West Virginia is found in the writings of John Peter Smalley who, accompanied by John Howard, Josiah Howard

and Charles St. Clair, left his home at the base of the Blue Ridge, in Augusta county, March 16, 1742, and began a trip of exploration into the country west of the mountains. They proceeded to New River, which they followed for a good many miles, then struck across the hills to another river which they followed to its mouth. "In those mountains," said Mr. Smalley, "we found great plenty of coals * * * we named it Coal river." And thus did Coal river and West Virginia coal first become known to the history of the country.

Christopher Gist, sent out by the Ohio Land Company to explore its holdings, spent the night of March 1, 1751, at the mouth of Slate creek in what is now Wood county, and reported that he saw there a "little branch which was full of coal."

In 1770 George Washington, journeying to the Ohio, reported that he saw a "Cole hill on fire." This was near the present town of West Columbia, in Mason county, where for a hundred years the people have known of "burnt hill" and of "Burnt Hill branch" that washes its base.

Philip Null, in 1800, discovered what is now known as the Pittsburg vein at Pocatalico river, in what is now Putnam county.

F. A. Michaux, the celebrated botanist, travelled from West Liberty, in Ohio county, to Wheeling in 1802, and wrote thus of what he saw: "A mile and a half from West Liberty town the road passed through a narrow valley four miles in length, the sides of which in some places from 25 to 30 feet in height exhibit strata of coal from five to six feet in thickness, and lying in a horizontal direction. This substance is extremely common in this part of Virginia."

The first effective exploration of the Appalachian coals, however, did not come until 1835, when Dr. Samuel P. Hildreth of Marietta, Ohio, published an account of the field in Siliman's "Journal of Sciences." The paper contained many details of the strata underlying the western border of Virginia, the territory now embraced within the State borders of West Virginia.

The publication of Dr. Hildreth's observation had immediate effect in stirring up interest in both Ohio and Virginia, and the following year both States began exploratory work with the design to establish the extent and value of the coal fields within their respective borders. In Virginia Professor W. B. Rogers, an expert geologist, was sent over the Alleghenies, into what is now West Virginia, to make investigation. He went to Pittsburg and proceeded thence southward to Clarksburg, following the course of what he denominated the "Upper Coal Series," and thus the coal along the Monongahela came to be known as the "Pittsburg Seam," but was for a long time known chiefly as the "Main Coal Seam of Northern Virginia." Later Professor Rogers traced this seam across the Little and Great Kanawha rivers, and found traces of it as far south as the Big Sandy. He traversed almost the entire area of what is now West Virginia, visiting many of the openings made for domestic and other purposes, and by 1840 he had found five workable and two non-workable seams, the whole aggregating 25 feet in thickness. Later he examined five veins of bituminous and two veins of cannel coal in the Great Kanawha Valley, all above the water levels; and at Brantz's Mines, now Mineral county, found the same number of seams overlooking the Potomac river. In 1843 the legislature of Virginia discontinued appropriations for the Geological Sur-

vey, and thus brought an end to Professor Rogers' work.

But the work already done was destined to have further results, for it brought into the field for investigation purposes numerous other geologists from various parts of this and other countries. One of these, Richard Cowling Taylor, an Englishman, known as the "Father of British Geology," came into the West Virginia field in 1848 to see for himself. In his "Statistics of Coal" he corroborated what Professor Rogers had reported as to the wonderful value of the field, and further observed:

"It would seem, therefore, that these thirteen coal beds, having an aggregate thickness of 40 feet, four seams comprising eight yards of workable coal, through nearly the whole length of the State, may be relied upon as the productive power of West Virginia."

Again referring to the Appalachian field he speaks of it as "that magnificent central, elevated region within whose borders slumber in undisturbed darkness untold millions of acres of coal."

Professor H. S. Daddow, of Pottsville, Pennsylvania, in his well known work, "Coal, Iron and Oil," published in 1866, said:

"West Virginia contains a larger proportion of the Allegheny coal field than any other of the States enumerated through which it extends. Over 16,000 square miles of this great coal field lie in West Virginia. * * * The best and most available portion of it lies in that State, and the greater portion of its vast area is naturally open to development, by the numerous streams that traverse its face from east to west. The Great Kanawha river running off at right angles from the Ohio, traverses the richest portion of the great Allegheny coal field, cutting the coal measures of this region—2,000 feet thick—to their base and developing their exhaustless mineral resources in the most available manner for production. But after performing this most acceptable service to the future prosperity of the West, it renders the benefits conferred still more valuable, by dividing the otherwise impassable Appalachian Chain at right angles and taking the nearest course to the waters of the East, thus opening the most available route (for a railroad) from the great rivers of the West to the seaport of the East, and connecting the minerals of the older geological formation—the iron and lead (in Southwest Virginia) with the coal of the trans-Allegheny field. * * * The coals of the Great Kanawha region, as we shall specially describe, are of various constituencies and are adaptable to all the requirements of the trades and manufactures. The hard and the coking, with the fat and gaseous bituminous, the variable splint, and the rich and oily cannel, are all found in the same mountains, and are accessible alike to the miner and to navigation, through the agencies of the eroding waters, which have exposed these coals in a thousand places. * * * This is the natural mining and manufacturing center of the great Allegheny coal field. * * * Coal river, Elk river, and the Gauley diverge from the Great Kanawha and spread their branches over one of the richest and most magnificent coal regions of the world. * * * The coals of this region, generally, are better, purer and more available for all the requirements of trade and manufacture than the coals of the Allegheny coal field. The seams of this coal are more numerous and their thickness greater than any other portion of this coal field; it can be mined cheaper and with more economy, generally, under the same rates of labor, than in any other in this country, without exception."

Something of the Early Developments.

The development of the coal mining industry in West Virginia has place among the industrial romances of the country. At the beginning of the last century coal was little used by the people of the territory now embraced with the lines of the State—only by the neighborhood blacksmiths, the settlers whose cabins stood near the out-crops, where the coal could be taken out without going under ground for it. Up to 1810 all the coal used in Wheeling was brought there in canoes and other small craft, and its price was so high that it could only be used for blacksmithing purposes. In 1810 Conrad Cotts, a miner, came to Wheeling from Pittsburg and began prospecting for coal, his labors being rewarded by finding a seam in a closely neighboring hill, and soon the entire population was using the output of the mine he opened. Cotts operated his mine for five years and then abandoned it, and it was never used again. But others had gone into the coal producing business, opened other mines, and the coal supply surrounding and underlying the city has had much to do with making it the great manufacturing and commercial center it has since become.

In 1809 Robert Fulton and Chancellor Livingstone sent Nicholas Roosevelt out from New York to investigate and report whether the Ohio river could be navigated by stream driven vessels, the intention being to build a steamboat for its navigation, if the report proved favorable. Arriving at Pittsburg, the investigator began the descent of the river in a small flatboat. He had not proceeded far before he became so convinced of the practicability of the proposed navigation that he "purchased coal land and opened mines of that mineral, and so confident was he of the success of his steam project that he caused supplies of the fuel to be heaped up on the shore in anticipation of the wants of a steamboat, whose keel was yet to be laid." The first steamboat west of the mountains, the "New Orleans," was built at Pittsburg, and was launched in 1811, and when she made her first trip down the river it was under steam generated by the use of the coal thus dug and stored by Nicholas Roosevelt.

It was not until 1817 that coal was discovered in the upper portion of the Great Kanawha Valley, bringing to light the riches of the heart of the greatest coal field of the world. At that time the Kanawha Salines formed the most productive salt region of the world. Wood was the fuel burned in the evaporation of the brine, and the nearby hills had been stripped of their timber to supply the demands of the furnaces. But in 1817 John P. Turner, who had resided in the Pittsburg region, came to the Kanawha Valley and engaged in supplying wood for the salt furnaces. He opened a mine at Burning Springs run, two miles above the town of Malden, and made a contract with one salt company to supply that fuel instead of wood. Other salt makers adopted coal as the better fuel, and soon it was the only kind used throughout the salt-making territory.

In 1818 a Cincinnati man, acting for a friend in New England, made an estimate of the coal used on the Ohio river between the mouth of the Great Kanawha and the Falls of the Ohio. He reported as follows: Maysville, 30,000 bushels; Cincinnati, 44,000 bushels; the Dean Steam Saw-mill, a hundred miles below Cincinnati, 12,000 bushels; the town of Louisville, 30,000 bushels—a total of 116,000 bushels represented the coal business for that entire section; less than one-fifth the amount one big Pittsburg towboat takes down the river now in one trip.

In 1832 George Birthistle began shipping coal from a point about half-way between Clifton and West Columbia, in what is now Mason county, West Virginia. It was hauled from the mine to the river on a sled drawn by oxen.

Professor Rogers, between the years 1836 and 1840, visited practically all the mines then open in West Virginia and made analyses of the output at Clarksburg, Pruntytown, Morgantown, on the Guyandotte river and Trace Fork, in Logan county; at Big and Little Sewell in Fayette county; at Brantzburg and Olivers Tract in Mineral county; at the forks of Stony river and at Michaels bank in Grant county; at Fomans Basin, Kingwood, Prices and Hagans banks in Preston county; at Stocktons bank and Ruffner's banks on Campbells creek and Hughes creek, and at D. H. Ruffner's bank on Grand creek and Turner's bank in the Salines in Kanawha county. In his report for 1840 Professor Rogers states that there were nearly ninety salt furnaces in the Great Kanawha Valley, manufacturing a million bushels of salt and consuming 200,000 tons of coal annually. The total coal production of the State for that year was 298,694 tons. There were 995 workmen employed in the mines, and the capital invested totaled \$1,301,855. Most of the coal produced was used in the salt furnaces on the Kanawha and for domestic purposes, in the homes of Wheeling.

When the Baltimore & Ohio railroad was completed to Piedmont, in 1843, small quantities of coal began to be shipped to Baltimore and taken thence by water to Philadelphia, where it brought high prices.

In 1847 Griffith B. Thomas and James Foley opened mines at West Columbia, in Mason county, and in 1853 "Clark's bank" was opened at Clifton, in the same county, by Thomas Potts, Henry Potts, Thomas Stewart and Thomas Clark, all English miners.

In 1854 corporations were formed to develop coal in the territory now comprising West Virginia, and by 1860 twenty-five such corporations were in existence. Western Virginia led in such companies as were formed, as Professor Rogers said, "not for the purpose of working stock, but of working coal." The attempt of these companies to interest foreign capital in this development work was interrupted by the Civil War.

Under the re-organized government of Virginia but one company of the kind was organized. That was the Pittsburg & Steubenville Coal Company, formed for the purpose of mining coal in Hancock county.

In 1865 the Averill Coal Company was organized and began developing mines at the mouth of the Pocatalico river, in Putnam county. In 1866 the Peytona Coal Company was chartered and began work on Coal river. In 1869 the Camden mines in Mason county were opened. In 1870 there were two mines in operation in Monongalia county, capitalized at \$1,200, employing three miners, paying out in wages \$700 annually, and getting out 2,400 tons of coal, valued at \$2,400.

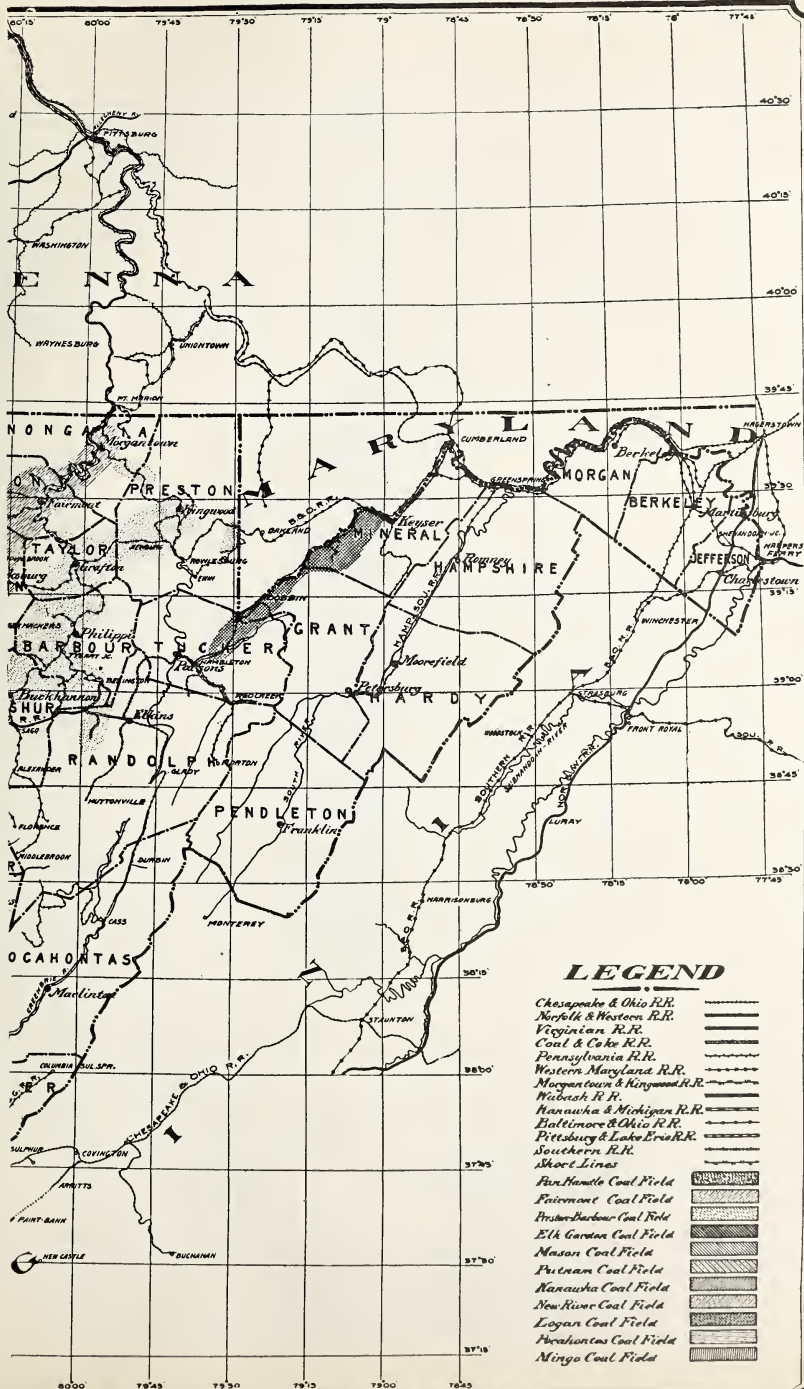
In 1873 John Nuttall came from Pennsylvania and began operating the uppermost seam of the Pottsville series in Great Sewell mountain, in Fayette county. This opening was soon followed by others, and before long coal mining in the Kanawha and New River fields was in full swing.

When the Baltimore & Ohio railroad reached Fairmont in the early fifties it found James Otis Watson ready to begin shipping coal to eastern markets, from a small mine he was then operating. From that beginning his business broadened out into the great Fairmont Coal Company,

— *SHOWING* —
RAILROADS AND OPERATING COAL FIELDS.

SCALE OF MILES





which afterwards was merged with other concerns into the Consolidation Coal Company, now the largest producer of bituminous coal in this country, with mines in four States.

During the eighties developments were begun in what is now known as the Norfolk & Western field, now the greatest producing field in the State.

During the same decade comprehensive developments were made under the leadership of Hon. Henry G. Davis in Randolph and Mineral counties in the territory now served by the Western Maryland and Coal & Coke railways, while early in the present century came the developments in the Logan field, and on Blue Creek, adjoining the Kanawha field.

Since the late eighties the developments have been so many, and they have come in such quick succession that a mere mention of them would prove tiresome. Suffice it to say that from the 200,000 tons which Professor Rogers reported as the output of West Virginia territory

in 1840 the production has grown until during the year last passed it reached the enormous amount of 73,000,000 tons.

The market for West Virginia coals is found along the Ohio and Mississippi rivers as far to the southwest as New Orleans; as far to the northwest as the farthest sweep of the Great Lakes; as far northeast as the New England States, and as far eastward as vessels sailing from United States ports can steam through Atlantic waters on their bunker supplies. With the opening of the Panama canal has come a still wider market for the makers of steam and producers of power, for the joining of the two oceans has opened the way for their utilization over a still wider area, and the coals from the West Virginia hills are making the steam to drive the ships of all nations through the uttermost waters of the mighty Pacific.

The Coals of West Virginia.

By C. E. Krebs,

Assistant Geologist, West Virginia Geological Survey, 1909-
1915. Consulting Engineer and Geologist, Member
of Firm of Clark & Krebs.

West Virginia is a State rich in deposits of bituminous coal. These deposits extend through Carboniferous series from the Dunkard, the highest, to the Pocahontas, the lowest member of the series. The coals vary in quality from a hard, black splint and cannel coal to a soft columnar gas coal; from an excellent domestic fuel coal to a superior gas, steam, coking and by-product coal.

There are about 85 different seams of coal in West Virginia; and 49 of the 55 counties of the State are underlaid with some of them, which are of sufficient thickness and purity to be of commercial value.

The coals of West Virginia lie in the greatest coalfield in the world, which has been named by Geologists the Appalachian. This field begins near the northern line of Pennsylvania and extends southwestward through West Virginia, Southern Ohio, Eastern Kentucky and Central Tennessee and ends in Western Alabama, being 900 miles in length from its northern to its southern terminus. The shape of this field is that of a rude canoe, one of the prows of which lies in Pennsylvania, the other in Alabama, while the broadest part of the body is found in West Virginia.

The length of this coal field in West Virginia, in a northeast and southwest direction, is about 150 miles, while its greatest width in a northwest or southeastern direction is possibly 100 miles, and the average width is less than 65 miles, making an approximate area of coal of 9,500 square miles.

There are at present 29 different seams of coal mined in a commercial way in the 1,000 mines in operation in West Virginia. The coals that are now being mined are some of the thicker beds; but the thinner beds will be of commercial value when these thicker beds have been exhausted.

Figure I. represents the different beds of coal in the Dunkard, Monongahela, Conemaugh and Allegheny Series.

Figure II. represents the different coals in the Kanawha Series and Figure III. represents the coals in the New River and Pocahontas series. Those coals with the mark "c" after them, in the graphic column, have reached suffi-

cient thickness and purity to be of commercial value at some point within the State.

It will be noted that the following are the number of coal beds in each series of commercial thickness and purity to be minable at this time:

Dunkard -----	1	Commercial coal bed
Monongahela -----	4	" " "
Conemaugh -----	4	" " "
Allegheny -----	6	" " "
Kanawha -----	20	" " "
New River -----	11	" " "
Pocahontas -----	4	" " "
Total -----	50	

The Kanawha series has the greatest number of coal seams, with the New River series as the next, while the Dunkard has only one bed of minable thickness.

The coal beds that underlie the area of 9,500 square miles are not the same in all parts of the State. One continuous vein does not extend to all portions of the area, and a core test hole, if bored down through all the rocks of the coal measures, from the highest to the lowest, would not pass through all the different coal beds at one point, but would pass through some of them.

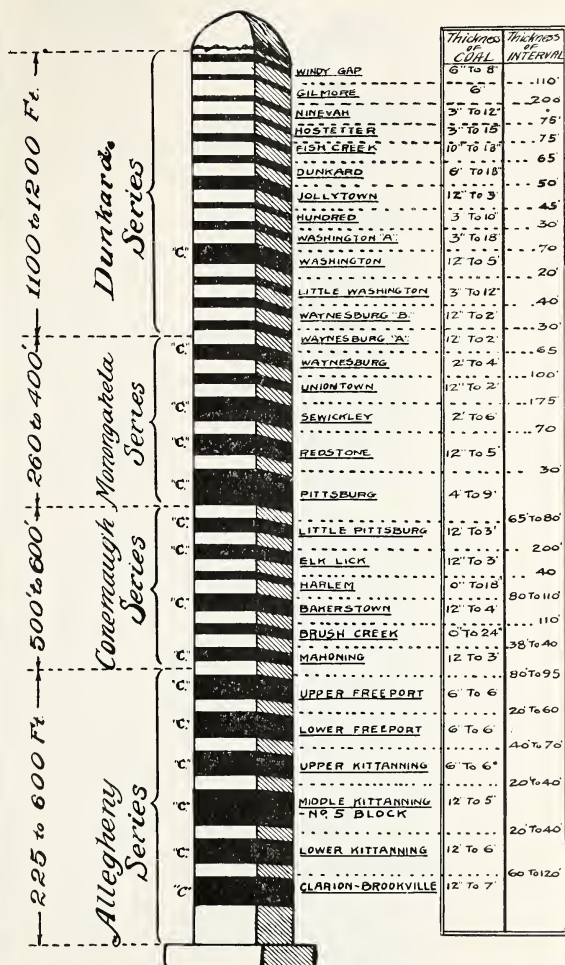
For the reason that in the northwestern portion of the State where the upper beds are present, the lower beds are thin and possibly absent altogether, and in the southeastern portion of the State, where the Pottsville coal beds are the thickest, the upper coal beds have disappeared into space. Thus there are usually only from two to ten different coal beds of commercial thickness and purity present at one place.

The Quality of the Coals.

The different commercial beds of coal in West Virginia have been carefully sampled by members of the State Geological Survey and analyses made of these samples in the laboratory of the survey. The results from these tests and analyses prove the West Virginia coals to be of superior quality.

Following are the results of the tests and analyses of

FIG. I



NOTE:—
"C." denotes
Coal bed of commercial
thickness and purity
to be minable.

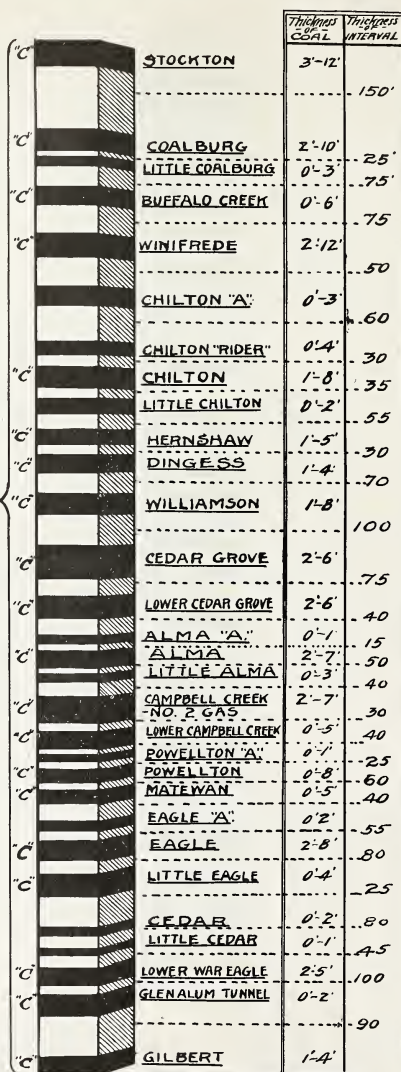
FILE NO. 3936
CLARK & KREBS
Civil & Mining Engineers
And Geologists.
Charleston, West Va.
April, 1915

DIAGRAM
— SHOWING —
COAL SEAMS
AND THEIR INTERVALS
IN THE
Dunkard, Monongahela,
Conemaugh and Allegheny
Series

IN
WEST VIRGINIA
PREPARED UNDER THE DIRECTION OF
C. E. KREBS
ASSISTANT STATE GEOLOGIST

FIG. II.

Upper Pottsville or Kanawha Series
1000 FT. TO 1850 FT.



NOTE:-

"C" denotes coal bed of commercial thickness and purity to be minable.

FILE NO. 3937

CLARK & ARCES

CIVIL & MINING ENGINEERS

B. GEOLG. 373

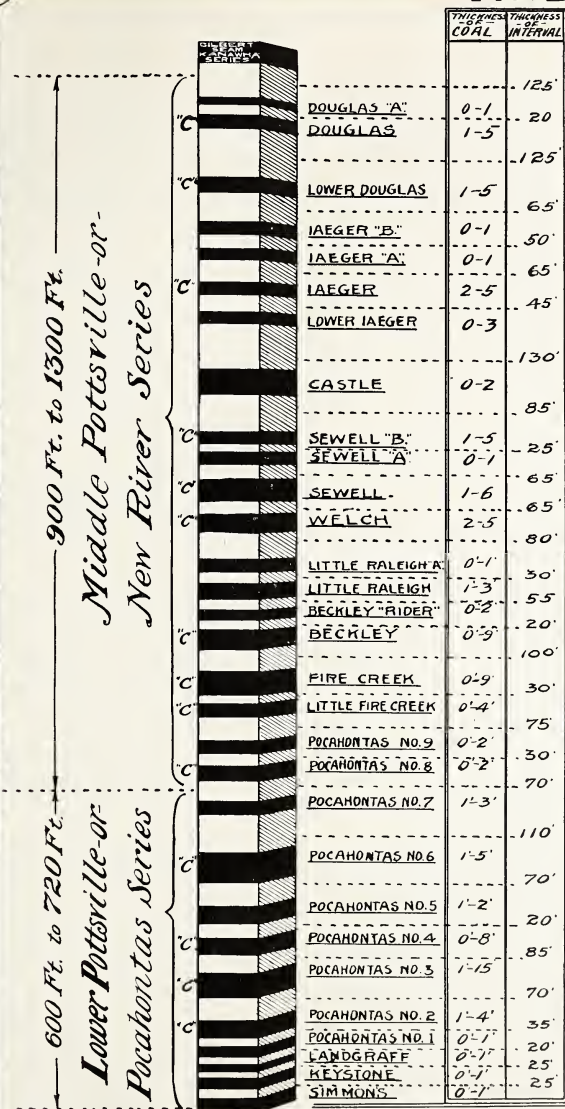
Charleston, W. Va.

April, 1915.

DIAGRAM SHOWING
COAL SEAMS
AND THEIR INTERVALS, IN THE
Kanawha Series
IN
WEST VIRGINIA

PREPARED UNDER THE DIRECTION OF
C. E. KREBS
ASSISTANT STATE GEOLOGIST

FIG. III



NOTE:-

"C" denotes coal bed of commercial thickness and ~ purity to be minable.

FILE NO. 3938
CURRY & KREBS

CIVIL & MINING ENGINEERS

& GEOLOGISTS

Charleston, W.Va.

April, 1915

DIAGRAM - SHOWING - COAL SEAMS AND THEIR INTERVALS, IN THE New River & Pocahontas Series - IN - WEST VIRGINIA

PREPARED UNDER THE DIRECTION OF
C. E. KREBS
ASSISTANT STATE GEOLOGIST

the different commercial beds in the State, as published in the West Virginia Geological Survey Reports, from time to time:

	Seams	Mois.	V.M.	F.C.	Ash	Sul.	Phos.	B.T.U.
1	Washington (1).....	1.04	34.37	45.76	18.83	2.76	.007	11,885
2	Waynesburg (1).....	0.43	34.40	47.67	17.50	3.70	.022	12,008
3	Sewickley (2).....	1.15	38.45	51.97	8.45	3.48	.005	14,187
4	Redstone (2).....	0.67	36.89	55.41	7.03	2.43	.009	13,831
5	Pittsburgh (2).....	0.67	37.03	55.68	6.62	1.65	.014	14,079
6	Little Pittsburgh (3).....	3.57	38.76	50.22	7.45	3.32	.049	12,660
7	Elk Lick (2).....	1.10	37.40	46.46	15.04	2.49	.006	13,360
8	Bakerstown (2).....	0.78	41.25	52.36	5.61	3.15	.005	13,698
9	Mahoning (2).....	1.15	36.38	56.55	5.92	1.45	.005	.....
10	Upper Freeport (4).....	0.79	29.45	61.91	7.85	1.51	.032	14,175
11	Lower Freeport (4).....	1.15	24.01	59.41	15.43	3.52	.013	.....
12	Upper Kittanning (4).....	0.86	29.78	58.53	10.83	2.37	.053	13,580
13	Middle Kittanning							
14	(No 5 Block) (2).....	0.68	19.37	71.20	8.75	1.76	.031	.....
15	Lower Kittanning (4).....	0.95	28.05	62.16	8.84	1.33	.063	13,978
16	Stockton-Lewiston (2).....	1.51	33.41	50.01	6.07	0.86	.002	.....
17	Coalburg (2).....	1.11	33.90	57.37	7.78	0.80	.004	.....
17	Little Coalburg (5).....	2.00	40.71	54.06	3.25	.88	.004	.....
18	Buffalo Creek (5).....	2.67	35.99	56.25	5.09	.75	.005	.....
19	Winifrede (2).....	1.09	36.59	58.42	3.90	0.63	.003	.....
20	Chilton (5).....	1.91	36.21	56.04	5.84	0.75	.006	14,258
21	Hernshaw (6).....	1.11	37.02	54.35	7.52	0.85	.004	.....
22	Dingess (5).....	1.50	40.81	50.43	7.26	1.43	.009	13,241
23	Williamson (5).....	1.62	38.53	53.13	6.72	1.82	.011	14,000
24	Cedar Grove (2).....	1.64	36.76	57.97	4.63	0.48	.003	.....
25	Alma (6).....	1.29	39.53	53.80	5.96	1.32	.005	14,120
26	Campbells Creek No. 2							
27	Gas (2).....	1.38	32.66	60.98	4.99	1.42	.015	.....
28	Powellton (2).....	0.77	32.38	62.37	3.54	0.76	.004	.....
28	Eagle (2).....	0.79	32.90	61.05	5.26	0.76	.009	.....
29	Little Eagle (2).....	0.25	29.45	60.85	9.45	0.57	.012	.....
30	Cedar (5).....	1.40	28.92	61.70	7.88	1.14	.010	13,965
31	Lower War Eagle (5).....	3.34	35.21	60.85	3.60	.79	.003	.....
32	Sewell (2).....	0.73	20.67	76.46	2.14	0.59	.003	.....
33	Welch (2).....	.74	17.72	74.07	7.47	0.74	.020	14,547
34	Beckley-War Creek (2).....	0.25	18.72	77.52	3.51	0.65	.005	.....
35	Pine Creek (2).....	0.82	20.08	74.65	4.45	0.63	.056	.....
36	Pocahontas No. 6 (2).....	0.70	19.66	76.54	3.10	0.58	.007	15,190
37	Pocahontas No. 4 (2).....	0.22	17.12	78.36	4.30	0.55	.002	.....
38	Pocahontas No. 3 (2).....	0.42	18.29	77.02	4.27	0.64	.003	.....

(1) Marshall, Wetzel and Tyler county detailed report, W. Va. Geological Survey.

(2) Bulletin II, West Virginia Geological Survey.

(3) Jackson, Mason and Putnam county detailed report, W. Va. Geological Survey.

(4) Preston county detailed report, W. Va. Geological Survey.

(5) Logan, Mingo county detailed report, W. Va. Geological Survey.

(6) Boone county detailed report, W. Va. Geological Survey.

An interesting fact is noted in the above table of coal analyses, that lower coals are higher in fixed carbon and B. T. U. and lower in volatile matter and ash, sulphur and phosphate, indicating that, as a general rule, the coals in the Pottsville series are purer and of higher quality than those in the upper series.

Quality of Available Coal in West Virginia.

The available coal area in West Virginia has been variously estimated by different geologists to be 9,500 square miles, or 6,080,000 acres. On the assumption that each acre carries 10,000 tons of coal, then there will be 60,080,000,000 tons of available coal in the State. That is of pure merchantable coal. To this quality should be added 100,000,000,000 tons of the low grade coal that at present is not merchantable, owing to the thinness of the beds and the cost of cleaning out the impurities from the same; but at a later date this coal will become valuable. This fixes the available coal tonnage of West Virginia, at present, at about 160,000,000,000 tons.

Quantity of Coal Mined.

When West Virginia became a State, in 1863, the annual output of coal was less than 50,000 tons. This has increased to more than 73,000,000 tons in 1914. Figure IV gives the production of coal on a graphic scale from 1863 to 1914.

The following table shows the production of coal for the calendar years 1863 to 1897 as given by the U. S. Geological Survey and for the fiscal years 1897 to June 30, 1914, as published by the report of the West Virginia Mining Department:

Year.	Short Tons.	Year.	Short Tons.
1863-----	444,648	1890-----	7,394,654
1864-----	454,888	1891-----	9,220,665
1865-----	487,897	1892-----	9,738,755
1866-----	512,068	1893-----	10,708,578
1867-----	489,360	1894-----	11,627,757
1868-----	609,227	1895-----	11,387,961
1869-----	603,148	1896-----	12,876,296
1870-----	608,878	1897-----	14,248,159
1871-----	618,830	1898-----	16,700,999
1872-----	700,000	1899-----	19,262,995
1873-----	1,000,000	1900-----	22,647,207
1874-----	1,120,000	1901-----	24,063,402
1875-----	1,120,000	1902-----	24,570,826
1876-----	896,000	1903-----	29,337,241
1877-----	1,120,000	1904-----	32,406,752
1878-----	1,120,000	1905-----	37,791,580
1879-----	1,400,000	1906-----	43,290,350
1880-----	1,829,844	1907-----	48,081,583
1881-----	1,680,000	1908-----	49,000,000
1882-----	2,240,000	1909-----	49,687,018
1883-----	2,335,833	1910-----	59,274,708
1884-----	3,360,000	1911-----	60,517,168
1885-----	3,369,062	1912-----	66,781,587
1886-----	4,005,796	1913-----	69,132,794
1887-----	4,881,620	1914-----	73,677,058
1888-----	5,498,800		
1889-----	6,231,880	Total-----	862,279,717

The foregoing table shows that in 52 years there has been only one year (1876) that did not show a steady increasing output, and that during that period the average annual increase has exceeded 1,400,000 tons. The annual average increase for the past ten years has exceeded 4,000,000 tons.

The total production for 52 years is 862,297,717 tons or a little more than one-half of one per cent. of the total available coal in the State. On the assumption that 200,000,000 tons of coal would be mined annually in the State it will take 800 years to exhaust West Virginia's coal supply. On this basis the coal supply of West Virginia has scarcely been touched, and the dirt has only been scratched away from her coal deposits.

Coal Producing Districts.

In accordance with the production of coal, West Virginia was formerly divided into five fields or regions, as follows:

The Fairmont, the Elk Garden, the Kanawha, the New River and the Pocahontas.

The writer has divided West Virginia into eleven coal fields as follows:

The Panhandle, Fairmont, Preston-Barbour, Elk Garden, Mason, Putnam, Kanawha, New River, Logan, Pocahontas and Mingo. Figure V. shows the approximate location of these coal fields and the different railroads in West Virginia.

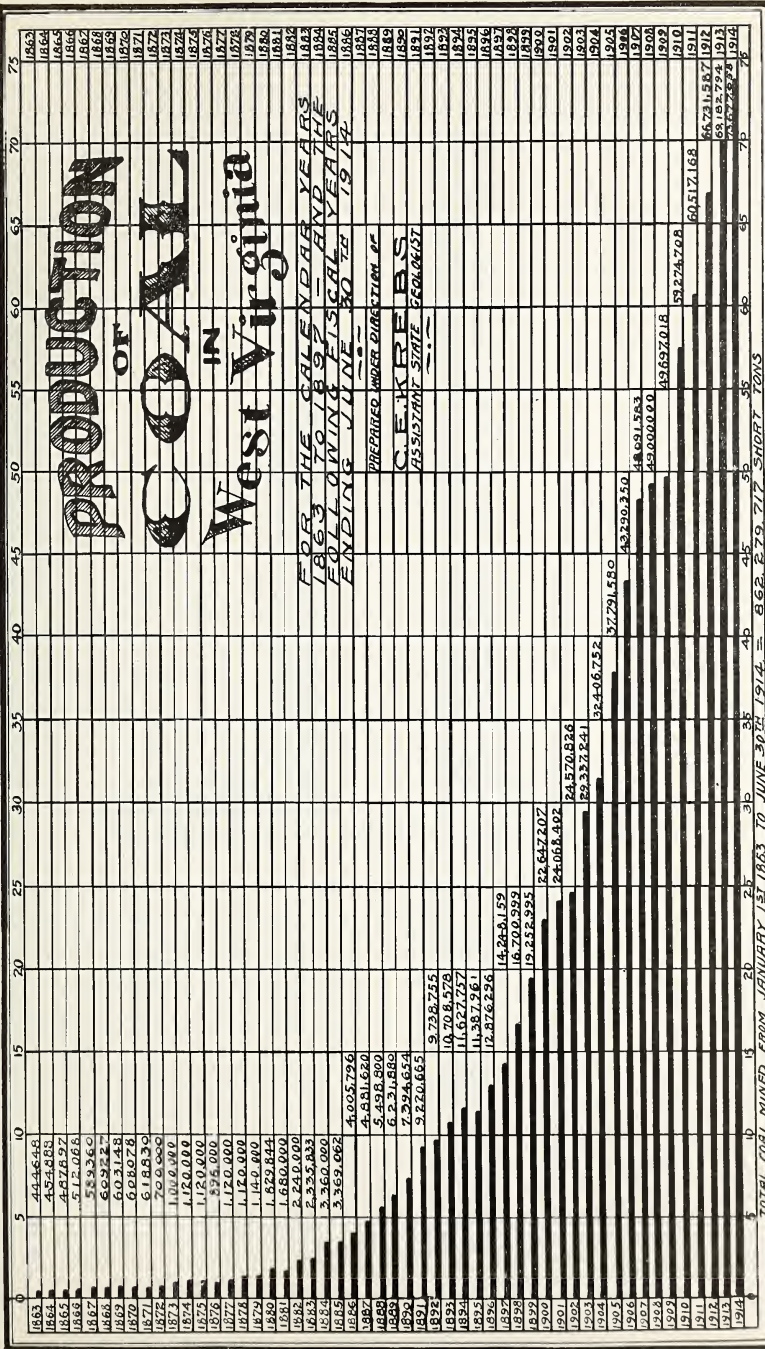
The Panhandle coal field includes the coal mined along the Ohio river in Marshall, Ohio, Brooke and Hancock counties, and embraces the Freeport and Pittsburgh coals.

The Fairmont Coal Fields includes the coals mined in central Monongalia, Marion and Harrison counties. The Pittsburgh is the principal seam of coal mined in this district.

The Preston-Barbour Coal Field is represented by the mining district in Preston, Taylor, Barbour and Upshur counties, and includes the Pittsburg, Redstone, Freeport and Kittanning coal beds.

The Elk Garden Coal Field was one of the first in which coal was mined on a commercial basis in what is now West Virginia. The coal was mined in this region long

FIG. IV.



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before the State was separated from the Mother State of Virginia, and was an extension of the Georges Creek field in Maryland. This field includes the coals in Mineral, Grant and Tucker counties. The coal beds are somewhat warped in this district, and semi-bituminous in character. The beds mined are the Freeport and the Kittanning Seams.

The **Mason Coal Field** includes the coal in Mason county along the Ohio river near Mason City. The coal has been mined in this field for a number of years, and the seam mined is the Pittsburgh.

The **Putnam Coal Field** is represented by the Pittsburgh coal bed that is mined in Putnam county between Winfield and Raymond City. These coals are used principally for domestic fuel.

The **Kanawha Coal Field** lies along Kanawha river and its tributaries, and includes the northern portion of Raleigh, western portion of Fayette, all of Kanawha and a small portion of Boone counties.

The coal ranges from a block and splint type to a high grade gas producing coal.

The **New River Coal Field** includes the coals mined in Fayette, Raleigh, and Wyoming counties, and is represented by the coals in the New River series.

The **Sewell, Beckley and Fire Creek** beds are the principal seams mined. The coal is a soft, columnar, gas and coking seam, and is known as a "smokeless" coal.

The **Logan Coal Field** includes the coals mined in Logan, Lincoln and southern Boone counties, and is a splint and gas coal.

The principal beds mined in this field are the Chilton, the Island Creek or Cedar Grove, the Alma or Draper, the Campbells Creek or No. 2 Gas.

The **Pocahontas Coal Field** lies in the southeastern corner of West Virginia, and includes the coals in McDowell and Mercer counties.

The coal mined is from the Pocahontas No. 3 and Pocahontas No. 4 beds. Some developing has recently been done in the Pocahontas No. 6 seam. All of these coals occur near the base of the Pottsville series. These beds produce a soft, semi-bituminous, columnar, high grade fuel, steam and coking coal. The coal mined from these beds has been pronounced one of the purest coals in the United States.

The **Mingo Coal Field** lies along Tug river in Mingo county, and includes the coals mined in the Kanawha series.

The Coalburg, Winifrede, Cedar Grove (Thacker) and War Eagle beds make up the principal coal beds mined in this field, producing splint, block and gas coals.

Following is a table of production of the foregoing districts as reported by Hon. E. A. Henry, Chief of the Department of Mines, in his report for the fiscal year ending June 30, 1914:

Coal Fields	Short Tons.
Panhandle	2,213,799
Fairmont	13,115,416
Preston-Barbour	4,797,676
Elk Garden	2,316,275
Mason	138,466
Putnam	621,514
Kanawha	10,736,285
New River	11,384,111
Logan	6,209,743
Pocahontas	18,924,335
Mingo	2,873,503
Small country mines	336,000
Total	73,677,058

It will be noted from the above table that the Pocahontas field easily leads in production, while the Fairmont field is second. It is also interesting to note that the Logan field produced more than one-half as much coal as the Kanawha field in 1914.

Location of the Various Coal Measures.

There are some coal beds in West Virginia, 2000 to 3000 feet below the Pocahontas coals, or base of the true Coal Measures. These belong, however, in the Pocono Sandstone or Big Injun Oil Sand division, the basal member of the Carboniferous system often called the "False Coal Measures" and are so impure and irregular and enclosed in strata so steeply inclined and crushed that they have been converted into a semi-anthracite. Some attempts have been made to develop these coals in the summits of the mountains of western Berkeley and eastern Morgan, as well as in Hampshire, Greenbrier, and other regions along the line between West Virginia and Virginia, but in all cases the areas holding coal have proven too small and narrow, and the coal itself too impure to warrant the expensive installations necessary for commercial development.

Classification.

The rock formation that make up the true Coal Measures in which the commercial coal beds of West Virginia occur have been subdivided by geologists as follows, beginning with the lowest or oldest:

Pottsville Series	Clarion.
	Lower & Middle Kittannings.

Pocahontas group (Lower).	Upper Kittanning.
Nos. 1 and 2	Lower Freeport.
No. 3.	Upper Freeport.
No. 4.	Conemaugh Series
No. 6, etc.	Brush Creek.
New River group (Middle).	Bakerstown.
Fire Creek.	Elk Lick.
Beckley.	Little Clarksburg.
Sewell.	Little Pittsburg.
Beaver River, or Kanawha group (Upper).	Monongalia Series
Eagle.	Pittsburg.
No. 2 Gas.	Redstone.
Cedar Grove.	Sewickley.
Winifrede.	Uniontown.
Coalburg.	Waynesburg.
Stockton-Lewiston.	Dunkard Series
Allegheny Series	Waynesburg A. and B.
	Washington.
	Jollytown, etc., etc.

The coals of these several groups will now be briefly described, beginning with the lowest and oldest, viz:

The Pocahontas Group.

The lowest group of the true Coal Measures was first exploited for commercial purposes near the town of Poca-

SECTION OF COAL VEIN
WORKED BY
FOUR STATES COAL & COKE CO
AT GORDON, ON CLEAR FORK OF
COAL RIVER
RALEIGH CO., WEST VA.



SECTION OF COAL VEIN
ON PROPERTY OF
EDWARD J. BERWIND
ON MARSH AND WEST FORKS OF
COAL RIVER
BOONE CO., WEST VA.



SECTIONS
SHOWING
COMPARATIVE THICKNESS OF
COAL SEAMS
ON
Big Coal River
and
Marsh and West Forks of
Little Coal River
BOONE COUNTY
West Virginia

PLAN NO. 2244
CLARK & KERR
CIVIL & MINING ENGINEERS
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J. W. MORGAN, DRAFTER

hontas, Tazewell county, Virginia, just east from the line between Virginia and West Virginia, and hence the coal beds in the first 600 to 800 feet of these basal rocks have been named in their order upward as Nos. 1, 2, 3, 4, 5, 6, etc., "Pocahontas," the thickest and most valuable bed of all being No. 3 Pocahontas, with its principal development in Mercer, McDowell and Wyoming counties. The coals of this group are practically all of the same physical aspect, having the typical coking, or columnar structure, soft, low in volatile matter, ash and sulphur, and generally known as smokeless coals, unexcelled for steam and general fuel purposes, being very highly prized for naval uses by the ships of every land owing to their high heating values and freedom from liability to spontaneous combustion on shipboard. Although excellent coking coals, the tendency in recent years is not to coke them separately in the bee-hive oven, but to mix them with higher volatile coals in by-product ovens located at the points of coke consumption so that at the present time few, if any, bee-hive ovens are building, many of those already constructed having been long idle, and it is hoped will remain so indefinitely, since the policy of transporting these splendid coals to by-product ovens, where the resulting fuel gases, coal tar, ammonia and other valuable by-products can be profitably utilized, is one that should have been followed from the very beginning of the coking industry in the Pocahontas region.

The character and quality of the No. 3 Pocahontas bed, which may be taken as typical of the other Pocahontas coals, is well illustrated by the average of 64 composite samples collected and analyzed by the U. S. G. Survey in 1909, the details of which are published in Bulletin Two, W. Va. Geological Survey in Table No. 2 as follows:

Moisture -----	0.68
Volatile Matter -----	14.29
Fixed Carbon -----	80.55
Ash -----	4.48
Totals -----	100.00
Sulphur -----	0.62
B. T. U. Calorimeter -----	15008

The average of 38 samples of No. 3 Pocahontas coal collected from mines in Mercer and McDowell counties by the W. Va. Geological Survey, all air dried and analyzed in the laboratory of the State Geological Survey, yielded the following results:

Moisture -----	0.23
Volatile Matter -----	17.47
Fixed Carbon -----	77.80
Ash -----	4.50
Totals -----	100.00
Sulphur -----	0.62
Phosphorus -----	0.0055
B. T. U. Calorimeter -----	15095

Average thickness of coal at the 38 mines sampled, 6 feet 5 inches.

The average of 13 samples of Pocahontas No. 3, and 10 samples of Pocahontas No. 4 collected and analyzed by the State Geological Survey as received from the mines, gives the following results:

	No. 3	No. 4
Moisture -----	1.83	1.79
Volatile Matter -----	15.51	15.54
Fixed Carbon -----	77.36	77.81
Ash -----	5.30	4.86
Totals -----	100.00	100.00

Sulphur -----	0.69	0.66
Phosphorus -----	0.009	0.006
B. T. U. -----	14869	14999

These results reveal coals of extraordinary purity and heating values, and fully account for the ever growing popularity of the Pocahontas coals in the markets of the world.

The other beds of the group, while thinner and not now of much commercial importance, are of practically the same chemical composition as No. 3 and No. 4, and the time is not very remote in the future when all of these pure coals, Nos. 1, 2, 5, 6, etc., of the Pocahontas group even down to 2 feet in thickness or less will become commercially valuable and be mined with much more care to save the product that the wasteful methods now in vogue for the thicker beds.

Pocahontas Coke.

When these Pocahontas coals are coked a very pure product results, its only weakness being due to its excessive purity, or low ash content apparently, so that its burden bearing capacity in the high modern iron furnaces is not equal to that of Connellsville or other well known furnace types, although the Pocahontas coke greatly excels them in heating value and for purely metallurgical purposes where great burden bearing capacity is not required. The following analyses give the average of 32 samples of Pocahontas No. 3 coke from as many oven plants in Mercer and McDowell counties, and of 3 samples of No. 4 Pocahontas coke from McDowell county, as follows:

Moisture -----	0.09	0.85
Volatile Matter -----	0.98	1.41
Fixed Carbon -----	90.99	89.08
Ash -----	7.94	8.68
Totals -----	100.00	100.00
Sulphur -----	0.58	0.67
Phosphorus -----	0.0061	0.011

The New River Group.

Higher up in the Pottsville series we come to a group of 3 coal beds which were first developed for commercial use along the canon of New River in Fayette and Summers counties, and hence the Pottsville coals of those counties and the adjoining region of Raleigh, Greenbrier, Nicholas, Webster, etc., to the northeast have already been known under the name of "New River" coals. These coals are 3 in number in the following ascending order, the lowest one coming 300 to 400 feet above Pocahontas No. 3, viz:

Fire Creek or Quinnimont coal.
Beckley coal.
Sewell coal.

These three beds are seldom all of commercial thickness in the same section or hill, and they occupy a rock interval of 300 to 350 feet, the Beckley coming about 100 feet above the Fire Creek seam, and the Sewell 200 to 250 feet above the latter. In character, quality, and general physical aspect, the New River coals very much resemble those of the Pocahontas group, except that they are slightly higher in volatile matter as well as a little lower in ash, thus outranking a very little the Pocahontas group in heat units. They also coke well, like the Pocahontas beds, and are specially popular for general steam and naval purposes.

Some of these same coals extend across southwestward

into McDowell county where they overlie the Pocahontas group and are known as the "Pocahontas thin veins," one of them which appears to correlate with a portion at least of the Sewell bed being known variously as the "Davy" or "Tug River" seam and being distinguished as furnishing coal with a greater B. T. U. value than any other bed of the entire Appalachian field.

The quality of these several coals is shown by the following averages of numerous samples both in the State Geological Survey laboratory, and in that of the U. S. G. Survey:

Fire Creek Coal:	Mois.	V.M.	F.C.	Ash.	Sul.	Phos.	B.T.U. Calo.
(Average 17 Analyses, W. Va. G. Survey) 0.60	19.93	75.20	4.27	0.67	.035	15208	
(Average 15 Analyses, U. S. G. Survey) 3.24	16.26	75.19	5.31	0.64	....	14391	
Beckley Coal:							
(Average 5 Analyses, W. Va. G. Survey) 1.32	16.61	78.07	4.00	0.79	.013	15041	
(Average 12 Analyses, U. S. G. Survey) 3.32	14.43	77.23	5.02	0.72	....	14452	
Sewell Coal:							
(Average 25 Analyses, W. Va. G. Survey) 1.10	19.72	75.67	3.51	0.88	.005	15030	
(Average 44 Analyses, U. S. G. Survey) 3.42	18.70	74.46	3.42	0.80	....	14629	
Welch Coal:							
(Average 5 Analyses, W. Va. G. Survey) 1.53	16.51	74.45	7.51	0.83	.020	14681	
(Average 3 Analyses, U. S. G. Survey) 2.29	13.55	75.88	8.28	0.54	....	14051	
Davy Coal:							
(Average 7 Analyses, W. Va. G. Survey) 1.90	18.08	77.03	2.99	0.67	.008	15345	

The coke from the Fire Creek and Sewell seams is also of very great purity as may be observed from the following average analyses:

From Fire Creek Coal:	Mois.	V.M.	F.C.	Ash	Sul.	Phos.
(Average 6 Analyses, W. Va. G. Survey) 0.13	0.98	91.71	7.18	0.64	0.0627	
From Sewell Coal:						
(Average 12 Analyses, W. Va. G. Survey) 0.14	1.06	91.26	7.54	0.75	0.0095	

These very pure coals of the New River group extend northeastward from that stream through Greenbrier, Nicholas, Webster and Randolph, thinning below present commercial dimensions in Tucker and Preston counties, the whole Middle and Lower rock groups of the Pottsville apparently disappearing before the Maryland line is reached to the northeast.

The Rich Mountain Coal Company has exploited two of these New River coals on the left fork of the Buckhannon river in Randolph county, probably the Sewell and Beckley, or Sewell and Fire Creek, where each of the beds is about 3 feet thick and separated by an interval varying from 30 feet to over 100 within a mile or less. These coals increase in volatile matter to the northeast, but they retain their very pure character in ash or sulphur contents even as far north as the Tygarts Valley river in the gorge of which below Elkins they have been explored. The Randolph county phase of these coals is illustrated by the following average analysis of 7 air dried samples, 3 from the left fork of the Buckhannon and 4 from the region below the Beverly and Buckhannon turnpike and the end of Rich Mountain in the gorge of Tygarts river:

Moisture	0.83
Volatile Matter	29.08
Fixed Carbon	65.15
Ash	4.94
Totals	100.00
Sulphur	0.86
Phosphorus	0.013

A specimen of coke made by the Rich Mountain Company from these coals and analyzed by the W. Va. Geol. Survey, gave the following results:

	Per Cent.
Moisture	0.36
Volatile Matter	0.29
Fixed Carbon	92.68
Ash	6.67
Totals	100.00
Sulphur	0.82
Phosphorus	0.010

When proper railway facilities are at hand, a large area of this coal can be operated between the New and Tygarts rivers that has as yet been only slightly explored, and these coals will furnish a very large tonnage of most excellent fuels and cokes throughout the region in question, where up to the present very little attention has been given them.

The Kanawha Group.

In Western Pennsylvania a thin group of rocks only 60 to 80 feet thick and containing but 3 unimportant coal beds makes its appearance between the Homewood sandstone, the topmost member of the Pottsville series in that region, and the main mass of the Pottsville or Connoquenessing sandstones below. The coals are hard, rather impure and inclined to be of the "block" type. In passing southwestward across West Virginia, this group of coals so thin and unimportant in western Pennsylvania, appears gradually to expand until on the Great Kanawha river the group attains a thickness of 1000 feet, and holds 6 or more valuable coal beds where the group received its name, "Kanawha." Still further to the southwest where these measures pass into Kentucky from southern Mingo, it attains a still greater development, measuring over 1800 feet, and holding 8 or more coals of commercial thickness at one point or another, but never all in the same section or mountain.

These Kanawha measures hold the principal coal beds in Webster, southeastern Braxton, Nicholas, northern Fayette, and Raleigh, Kanawha, Boone, Lincoln, Logan, Wyoming, and Mingo counties as may be seen on the accompanying state geological map.

The coals in the Kanawha or Upper Pottsville group, subdivide naturally into two classes, very distinct in physical character. In the upper portion of this great formation as indicated by the diagram, are three beds, viz: in descending order, the Lewiston or Stockton, the Coalburg, and the Winifrede. These are all characterized by layers of very hard, pure coal which split into oblong blocks with a physical appearance intermediate to ordinary bituminous coal and cannel. These beds vary in thickness from 3 to 12 feet, and it often happens that no more than one of them and seldom more than two are present in commercial condition on the same property. These coals, on account of their high fuel value and resistance to pulverization in transportation and handling, as well as their small loss of fuel value in storage, have long retained their hold on commercial markets under the name of "Kanawha Splint."

The quality of the three coals is very similar, as may be observed by the following averages from several analyses of each, made in the laboratory of the State Geological Survey.

	Mois.	V.M.	F.C.	Ash	Sul.	Phos.
Lewiston coal.....	2.19	33.27	60.02	4.50	1.08	.008
Coalburg coal.....	2.16	32.77	55.13	7.78	0.81	.004
Winifrede coal.....	1.84	34.44	56.92	6.79	0.66	.005
General average.....	2.06	33.49	57.36	6.36	0.85	.006
Average B. T. U.....						13672

The above averages give the true chemical composition of these famous "Kanawha Splints," and they also emphasize their superior quality as fuels, as well as insure a continuous demand for them in the markets of the country.

Lower Kanawha Coals.

Separated from the lowest of the 3 Upper Kanawha or Splint coals just described by an interval of 200 to 300 feet of rocky strata, there comes in another class of coals, usually 4 in number, but sometimes more. These coals are softer than the Splint coals above, and gradually approach with the lowest one (Eagle) the columnar structure of the New River coking coals, although much higher in volatile matter, and therefore known in the market as "gas" coals, two of them having received the names, "No. 1 Gas," and "No. 2 Gas." With the exception of the uppermost (Cedar Grove) which is intermediate in type to Splint and ordinary soft bituminous coal, they constitute excellent coking coals as well as general fuels for either steam or domestic purposes.

The average chemical constitution of these several beds as shown from analyses made by the State Geological Survey is as follows:

	Mois.	V.M.	F.C.	Ash	Sul.	Phos.
Cedar Grove coal....	0.94	35.91	57.99	5.21	0.75	.0036
No. 2 Gas coal.....	1.49	33.42	59.59	5.50	1.29	.010
Powellton coal.....	1.33	32.19	60.61	5.87	0.97	.006
Eagle coal.....	1.80	29.29	64.04	4.17	0.77	.010
General average.....	1.39	32.88	60.56	5.19	0.95	.007
Average B. T. U.....						14405

These analyses reveal a progressive decrease in volatile matter, and a corresponding increase of fixed carbon in descending to lower and lower coal beds from the top of the Kanawha series. They also disclose the fact that the Lower Kanawha coals, as well as those of the Upper Kanawha series, are fuels of great purity and general excellence, being high in fixed carbon and heat units as well as low in the impurities of ash, sulphur, and moisture.

The general excellence of all the coals in the great Kanawha group is so well known to the coal markets of the country that it is unnecessary to describe each particular bed in detail, except to state that the No. 2 Gas coal is the most persistent and valuable bed of the entire group, and probably furnishes a greater tonnage than any other single member. It generally contains enough hard or splinty coal to make an ideal shipping fuel while the softer layers yield an excellent coke and are also valuable for gas making purposes. Some excellent coal is generally present wherever the horizon of this bed is above water level, the principal mines on the Upper Guyandotte, at Holden, Dingus Run, etc., being in this seam, while at Warfield, Rawl, and other points on the Tug the same bed appears to be present in commercial thickness as well as on all the tributaries of the upper waters of Big and Little Coal rivers. It is also a valuable coal across Nicholas and Webster counties though declining in thickness from 5 feet, its average on the Kanawha and south-westward, to 3 and 3½ feet in Webster and southeastern Braxton.

Allegheny Series.

Immediately above the top of the Pottsville beds, there comes another series of sandy shales, coals, fire clays, sandstones, and occasionally one or more limestones, the whole rock formation having a thickness of 250 to 300 feet on the Allegheny river in western Pennsylvania where these strata were first studied and named the Allegheny series. There it contains, in different regions, 6 or more coal horizons that furnish fuel of commercial value, as follows:

Upper Freeport (Thomas)
Lower Freeport.
Upper Kittanning.
Middle Kittanning.
Lower Kittanning (Davis).
Clarion.

Of these 6 beds that are mined at different points in Pennsylvania, only two, viz; the Upper Freeport and Lower Kittanning, have been mined to any considerable extent in West Virginia, and of these the Lower Kittanning bed appears to be the most widely persistent and valuable. It is known under different local names in the several regions of the state, being often called the "Six-Foot" seam along the North Potomac river, the "Davis" seam at Thomas, and adjoining regions, the "Roaring Creek" bed in Randolph and Barbour, and the "No. 5 Block" throughout Clay, Nicholas, Fayette, Kanawha, and other counties in the southwestern region of the State. It is generally of workable dimensions wherever its outcrop lies above drainage, and its wide distribution and uniform good quality render it one of the very valuable coal horizons of the State.

The coal differs in type greatly in the several regions as expressed in the chemical analyses now to be given, being lower in volatile matter in the mountain regions than in others. The following average of 5 analyses represents in a general way the character of the Lower Kittanning coal along the North Potomac river between Piedmont and Gorman:

	Per Cent.
Moisture	1.81
Volatile Matter.....	14.79
Fixed Carbon.....	71.59
Ash	11.81
Totals	100.00
Sulphur	2.62
Phosphorus	0.048
B. T. U. Calorimeter.....	13615

Another type of this coal is found farther up the North Potomac toward its headwaters, where the Davis Coal & Coke Company carries on extensive operations in the vicinity of Coketon, Tucker county, as illustrated by the following analysis of an air dried sample:

	Per Cent.
Moisture	0.48
Volatile Matter.....	20.72
Fixed Carbon.....	72.29
Ash	6.51
Totals	100.00
Sulphur	0.82
Phosphorus	0.02
B. T. U.	14500

Still another type of this same coal occurs in the Roaring Creek region of Randolph and Barbour counties as exhibited by the following analysis of an air dried sample of the same in which the volatile matter is higher:

	Per cent.
Moisture -----	0.74
Volatile Matter-----	30.38
Fixed Carbon-----	59.59
Ash -----	9.29

Totals -----	100.00
Sulphur -----	1.65
Phosphorus -----	0.023
B. T. U. -----	13901

The No. 5 Block type of this coal which comes in toward the southwestern half of the State is represented by the following average of 6 samples as received from the mines:

	Per cent.
Moisture -----	1.81
Volatile Matter-----	33.17
Fixed Carbon-----	57.56
Ash -----	7.46

Totals -----	100.00
Sulphur -----	0.80
Phosphorus -----	0.008
B. T. U. Calorimeter-----	13536

Many of the mines on No. 5 Block coal show higher in B. T. U. than this average, and it is one of the splendid fuel coals of the State, always holding the market wherever it has been once introduced.

The Middle Kittanning coal of the Pennsylvania section appears to be united with the Lower one at most localities in West Virginia, and hence is not known as a separate bed.

The Upper Kittanning coal, with a thickness of 3 to 4 feet, has been mined at only a few localities in the State, viz: in Monongalia, Preston, Taylor, Barbour, Randolph, Upshur and Lewis counties, and then only in a small way by the farmers, since it is always overshadowed by the thicker and more important bed (Lower Kittanning) 40 to 50 feet below. It is rather high in ash, 10-12 per cent., but will sometimes furnish a large tonnage of fairly good fuel. It has been observed at only a few localities in the Kanawha region, one of which is at Crescent, Fayette county, where a bed of coal 4 feet thick has been mined at 58 feet above the No. 5 Block seam, and apparently the same seam has been opened on Kelly's creek, where it is partly canal, at 45 feet above No. 5 Block.

The Lower Freeport coal is of very little economic importance in West Virginia, and has not apparently been mined for commercial shipment anywhere in the State, being generally thin and impure, and frequently absent from the section completely.

The Upper Freeport coal at the top of the Allegheny series is an important bed in the northern portion of the State across Preston and eastern Monongalia, and possibly in some portions of northern Barbour, as well as through Tucker and Mineral counties along the North Potomac coal basin, but southwestward from Barbour county this coal thins down to 1 or 2 feet or disappears entirely until we reach Lincoln county where, in the region of Griffithsville and Hamlin, it appears to thicken up to a bed of commercial value. It has been extensively developed on the waters of Deckers creek in Monongalia and Preston counties for coking purposes, as well as in the region of Newburg, Austen and Tunnelton, Preston county, where there are several large mines. Quite recently the fuel from this bed in the Deckers creek region of Monongalia and Preston counties has come into high favor as a coal to mix with the low volatile coals of the Potomac basin in the manufacture of by-product coke.

Like the Kittanning below, the Upper Freeport bed is much lower in volatile matter in the Allegheny Mountain or North Potomac region than west of the same, as will be observed by the following two types of analysis, being the average of 4 samples from each region:

	Allegheny Mountain	Deckers Creek
Moisture -----	1.44	1.46
Volatile Matter-----	14.60	29.53
Fixed Carbon-----	74.96	62.33
Ash -----	9.00	6.67
Totals -----	100.00	100.00
Sulphur -----	1.56	1.10
Phosphorus -----	0.02	0.03
B. T. U. Calorimeter-----	14621	14171

The volatile matter in the samples from the North Potomac basin, it will be noted, is only half that in the Deckers creek fields.

The Conemaugh Series.

The next succeeding group of rocks above the Allegheny is known as the Conemaugh series, and has a thickness of 510 to 600 feet in most regions of West Virginia, containing 6 or more coal horizons.

The upper two-thirds of the Conemaugh beds is composed largely of soft red shales, which have a tendency to slide, giving much trouble and expense to the railways in cuts, tunnels, etc., and also to the oil well drillers, since access of water converts them into mud which "caves" badly and frequently results in loss of drilling tools and the hole already drilled. The lower third, however, consists mostly of massive sandstones (Buñalo and Mahoning) which often furnish good building stone, and when deeply buried may hold considerable quantities of oil and gas.

The coal horizons of the Conemaugh are the following in described order:

Little Pittsburg.
Little Clarksburg.
Elk Lick.
Harlem.
Bakerstown.
Brush Creek.

The only coals of the Conemaugh series that attain any considerable economic importance are the Brush creek, which comes 50 to 80 feet above the Upper Freeport, the Bakerstown, which comes 180 to 200 feet above the Upper Freeport bed, and the Elk Lick coal, 160 to 180 feet higher. The Harlem coal has occasionally been mined by the farmers for local use, but it is generally only 1 or 2 feet thick and often absent entirely.

The Brush creek bed attains some importance in Hancock county where it has been mined for commercial purposes, and exhibits the following composition on Hardin run, near New Cumberland:

Moisture -----	1.15
Volatile Matter-----	36.38
Fixed Carbon-----	56.55
Ash -----	5.92
Totals -----	100.00
Sulphur -----	1.45
Phosphorus -----	0.005

The Bakerstown coal which belongs 100 to 120 feet above the Brush Creek bed is quite widely distributed, and frequently attains commercial value in Preston, Barbour, Mineral, Braxton, Upshur, Brooke and other regions of

the State. Its composition in the different districts is shown by the following analyses:

	Mineral County.	Preston County.	Lewis County.	Brooke County.
Moisture -----	1.59	1.05	1.31	0.78
Volatile Matter -----	14.91	28.35	36.71	41.25
Fixed Carbon -----	73.17	63.45	55.01	52.36
Ash -----	10.33	7.05	6.97	5.61
Totals -----	100.00	100.00	100.00	100.00
Sulphur -----	2.30	2.48	0.88	3.15

The increase in volatile matter with distance from the Allegheny Mountain region represented by the Mineral county samples, is well illustrated by these analyses. The coal is seldom more than 3 feet thick, but is highly prized both for steam and domestic purposes.

The Elk Lick coal, which comes about 150 to 180 feet above the Bakerstown bed, and like it only about 3 feet thick, is occasionally of some importance, but is generally quite high in ash, containing 15 to 20 per cent. It is mined occasionally for local use, and was once opened for commercial purposes on the Coal & Coke Railway near Jacksonville, Lewis county, where it has the following composition:

Moisture -----	1.73
Volatile Matter -----	37.17
Fixed Carbon -----	46.15
Ash -----	14.95
Totals -----	100.00
Sulphur -----	2.48
Phosphorus -----	0.106
B. T. U. -----	13276

Monongahela Series.

The last and highest series of rocks to hold valuable commercial coals is the one which crops so extensively along the Monongahela river drainage from Weston through Clarksburg, Fairmont, Morgantown, Brownsville and Pittsburg, and therefore bears the name of that great freight producing stream which carries on its bosom more annual tonnage than any other stream in the world.

The Monongahela series varies in thickness from 300 to 430 feet, having the great Pittsburg bed at its base and the Waynesburg coal at its top with the Redstone, Sewickley, and Uniontown coal beds intermediate at 40, 100 and 250 feet respectively above the base of the series.

The Pittsburg Coal.

The main coal bed of the Monongahela series is the one which forms its base, and of which Dr. J. C. White gave the following description in 1897 in his vice-presidential address before Section E of the American Association for the Advancement of Science at its Madison, Wisconsin, meeting:

"Among the rich mineral deposits of the great Appalachian field, the Pittsburg coal bed stands preeminent. Other coal beds may cover a wider area, or extend with greater persistence, but none surpasses the Pittsburg seam in economic importance and value. It was well named by Rogers (H. D.) and his able assistants of the first Geological Survey of Pennsylvania, in honor of the city to whose industrial growth and supremacy it has contributed so much. Whether or not the prophetic eye of that able geologist ever comprehended fully the part which this coal bed was to play in the future history of the city which gave it a name we do not know; but certain it is that the seven feet of fossil fuel which in Rogers' time

circled in a long black band around the hills, and overlooking the site of Pittsburg from an elevation of 400 feet above the waters of the Allegheny and Monongahela, extended up the latter stream in an unbroken sheet for a distance of 200 miles, has been the most potent factor in that wonderful modern growth which has made the Pittsburg district the manufacturing center of America, and which bids fair to continue until it shall surpass every other district in the world, even if it does not now hold such primacy."

This was written 18 years ago and the prophecy there made has long been more than fulfilled, since the Pittsburg district has been recognized as the greatest manufacturing district in the world for more than 10 years, and made so almost entirely through the agency of the great coal bed in question. Pennsylvania and West Virginia had in 1908 practically equal areas, viz: about eleven hundred thousand acres each of this great bed, but Pennsylvania is exhausting her field at the rate of 100,000,000 tons or 12,500 acres annually, so that 50,000 acres or nearly one-twentieth of her entire Pittsburg coal area has been mined in only four years. West Virginia in the same four years has mined only about 50,000,000 tons from her Pittsburg coal area, representing but 6,250 acres of exhausted territory. Of course, the production from both areas will gradually increase as the years pass, but it is evident that West Virginia will still have a large area of this splendid fuel long after that from her sister States of Pennsylvania and Ohio is practically gone, only 40 to 50 years hence.

The quality of the Pittsburg coal varies considerably in the different regions of the State, and also much in the same region, but the following general averages of air dried samples will fairly represent the regions mentioned:

	Mois.	V.M.	F.C.	Ash.
Monongahela river region -----	0.75	38.16	54.64	6.45
Ohio, Brooke and Marshall -----	0.93	39.46	51.35	8.26
Mason county -----	1.88	40.21	47.78	10.13
Putnam and Kanawha counties -----	1.83	38.76	51.86	7.55
Gilmer and Braxton counties -----	1.87	38.51	52.50	7.15

The average of 52 mines, the result of many analyses by Mr. Frank Haas, formerly Chief Chemist of the Fairmont Coal Company, gave this coal for the Monongahela river region the following composition:

Moisture -----	1.43
Volatile Matter -----	37.47
Fixed Carbon -----	53.83
Ash -----	7.27
Totals -----	100.00
Sulphur -----	2.59
B. T. U. Calorimeter -----	14014

Outside of restricted areas where narrow belts of low sulphur Pittsburg coal exist, like that extending from the West Fork river in Marion county near Monongah north-eastward toward Underwood or Farmington on Buffalo creek, the above averages of Mr. Haas may be considered as fairly representative of the Pittsburg coal in the region drained by the waters of the Monongahela and its tributaries in West Virginia, while the following average of 11 samples from the different portions of the Chatam mine of the Jamison Coal & Coke Company near Underwood, Marion county, will represent the low sulphur type of restricted areas:

Moisture -----	1.32
Volatile Matter -----	35.79
Fixed Carbon -----	56.11

Ash -----	6.27
Totals -----	100.00
Sulphur -----	1.05

An ideal steam and domestic fuel, the purer portion of the seam being unexcelled for gas and coking purposes, this three-fold use to which the Pittsburg bed is so well adapted renders it one of the most valuable single deposits of the entire Appalachian coal field, and hence the large and almost virgin area of the bed remaining unmined in West Virginia must prove a very rich heritage and one that should attract many additional factories to her domain in the near future.

The Redstone Coal.

The Redstone coal bed belongs about 40 feet above the Pittsburg seam, and resembles the latter very much in chemical composition. Aside from a small area in Monongalia county on Robinson run, its chief development in commercial thickness is found in southeastern Harrison, western Barbour, northern Upshur, and portions of Lewis county. That the character of the coal is very much like the Pittsburg is shown by the following analysis of the bed at the Century Mine, Barbour county:

Moisture -----	0.67
Volatile Matter -----	36.89
Fixed Carbon -----	55.41
Ash -----	7.03
Totals -----	100.00
Sulphur -----	2.43
Phosphorus -----	0.009

This bed will furnish a large tonnage of fuel from the region indicated.

Sewickley Coal.

Lying 60 to 80 feet above the Redstone seam and 100 to 120 feet above the Pittsburg bed there occurs another valuable coal bed known as the Sewickley, which underlies practically all of Monongalia and Marion counties west from the Monongahela river, the northern half of Wetzel and nearly all of Marshall and Ohio counties with a thickness of $3\frac{1}{2}$ to 5 feet of very excellent fuel of the approximate composition shown by the analysis of a sample of coal taken from the Parker Run Mine just below Rivesville, Marion county, as follows:

Moisture -----	1.47
Volatile Matter -----	38.34
Fixed Carbon -----	51.79

Ash -----	8.40
Totals -----	100.00
Sulphur -----	3.47
Phosphorus -----	0.005
B. T. U. Calorimeter -----	14142

The heating value of the Sewickley coal is equal or even superior to that of the Pittsburg bed, and although it holds about one per cent. more sulphur, this extra amount does not appear to interfere with its steaming and domestic fuel uses. It will furnish a large quantity of valuable fuel when active mining operations begin on this bed in the not distant future.

The Uniontown Coal.

At 100 to 150 feet above the Sewickley seam there is frequently found another coal which attains some importance over limited areas in Wetzel, Marion, Tyler, Doddridge and Lewis counties, having practically the same chemical composition as the Pittsburg coal in the Wheeling region, except that it is slightly higher in sulphur. It will probably yield a half billion or more tons of fairly good fuel coal in the counties mentioned. The seam is known as the Uniontown.

The Waynesburg Coal.

The Monongahela series ends at the top with the Waynesburg bed, which has a good thickness in western Monongalia, and Marion, and is 3 to $3\frac{1}{2}$ feet thick over about half of Wetzel, and much of Marshall and Ohio counties. It is a low grade fuel, however, being high in ash, sulphur, and moisture, compared to the Sewickley, Redstone and Pittsburg coals. It will eventually be mined, however, and will furnish many hundred million tons of fuel.

The Dunkard Series.

Capping the Monongahela series with its rich deposits of coal, especially in the northern half of the State, there occurs the Dunkard series of sandstones, shales, and thin limestones, in which several beds of coal occur, only two of which ever attain commercial value. These are the Waynesburg "A" bed, at 80 to 90 feet above the base of the series, and the Washington coal, 80 to 90 feet higher. This last coal is very widely distributed and often has $1\frac{1}{2}$ to 2 feet of good coal with 3 to 4 feet more of low grade fuel. It will probably be the last coal to be mined in the State and will furnish many hundred million tons of low grade fuel.



West Virginia Coal and the Panama Canal.

To the man who gives but superficial thought to the effect of the Panama canal upon the business of the country it may appear absurd to state that the completion of that colossal enterprise will have direct and important bearing upon the progress and prosperity of West Virginia. Yet there is probably no State in the Union that will benefit more immediately, more largely or more permanently from the building of that great commercial artery between the two oceans.

West Virginia has a larger area of high grade bituminous coals than any other State, the total amount lying in seams of workable thickness being estimated at about one hundred and sixty billion tons. In the production of this kind of coal the State stands second only to Pennsylvania, having years ago passed Ohio. The fact that a very small percentage of its coal production is consumed inside the State makes it imperative that markets be secured in other States and other countries. To reach the markets heretofore served it has been necessary to carry most of the West Virginia product through competitive fields, the coals from which enjoy the benefit of freight differentials that make a very considerable difference in the cost of delivery. Only the superior quality of the West Virginia product has enabled it to compete for the trade thus reached.

The Panama canal has opened up to West Virginia coals a number of markets, actual and potential, in which they will enjoy the benefit of the differentials in freight against which they have up to the present time been compelled to struggle. These differentials will operate to their advantage against all others except those coals from the comparatively limited fields of Virginia and the but slightly developed regions of Eastern Kentucky.

In presenting a few of the facts that form proof of the statement that West Virginia will enjoy the large benefits from the opening of the canal hinted at above, acknowledgment is made of the value of the speech of former Governor W. A. MacCorkle to the West Virginia Coal Association, from which many of the facts and figures here used have been taken. This speech, the facts in which were gathered with accurate care and presented with convincing force, has been distributed by thousands by the West Virginia Coal Association, and has been translated into at least one foreign language, that of Japan.

It is expected by those who have made close study of the trend of trade affairs that the Panama canal will become the world's greatest trade route. If this expectation is realized, the canal zone will become the world's greatest distributing point for fuel, and if, as we believe, West Virginia, by reason of the cheaper delivery and higher heat-producing power of its product, becomes the dominating influence in furnishing coal to the canal zone, then will West Virginia be the dominating factor in the fuel equation of the world's water-borne commerce.

The belief that the Panama canal will be the highway for the larger proportion of the trade between nations is based upon geographical facts. Contrary to the general belief, Asia, Australia and the Orient generally are nearer Europe by way of the Suez canal than by way of Panama. From Liverpool to Adelaide by the former route is 11,142 miles; by the latter 13,478. From Liverpool to Manila is 9,701 miles by way of Suez and 13,122 by way of Panama. From Liverpool to Hong Kong is 9,785 miles by way of Suez and 13,957 miles by way of Panama. From Liverpool to Yokohama is 11,678 miles by way of Suez and

12,372 by way of Panama. From Liverpool to Yokohama is 11,678 miles by way of Suez and 12,372 by way of Panama.

But from New York to any of the places named the distance is much less by way of Panama than by way of Suez, and to most of them it is less from New York by way of Panama than from Liverpool by way of Suez. And from every South Atlantic port and every port on the Gulf of Mexico the distance to any of the points named is considerably less by way of Panama than it is from Liverpool by way of Suez. So that whatever difference distance may make in the matter of supplying these various countries of the East is in favor of the mines and furnaces and factories of the United States, and the Panama canal route.

With respect to the vast and rapidly developing countries lying to the south of the canal whose western boundaries are marked by the tides of the Pacific, their commerce, whether with Europe or the United States, must be carried by way of Panama.

The important part in water transportation borne by cheap coal is clearly shown by estimates made by the government in 1911. It was found that year that a vessel of 4,640 tons, making the round trip between New York and Manila by way of Suez, at an average speed of ten and a quarter knots, consumed 4,475 tons of coal, costing \$20,868.75. Careful calculations showed that the same vessel, sailing by way of Panama, and coaling at Newport News, Colon, San Francisco and the Japanese ports, would have used \$18,222.50 worth of coal, a difference of \$2,646.25 in favor of the Panama route. At the prices prevailing for coal in 1912 the saving by way of Panama would have been \$4,041.75.

Seeing then the tremendous importance of cheap fuel to ocean commerce, it is easy to understand that the future development of trade between this country and those of the Orient, of Australia, of Central and South America and the Islands of the Pacific, will mean a vast deal of business for the coal producing community that is able to supply any considerable proportion of the demand.

Recognition of these things led the United States government to construct at both ends of the canal immense coaling stations, equipped with the latest and most approved machinery and appliances for the rapid and economical handling of large amounts of fuel.

Let us consider then the bearing these things must have upon West Virginia. After many tests of coal from all available fields government officials decided that West Virginia coals meet the requirements of the isthmus better than those of any other coal-producing region, and they are, therefore, more largely used there. Speaking in a broad way, it may be said that West Virginia coals will be the greatest single beneficiary of the digging of the Panama canal, because of their cheapness of production, the low cost at which they can be delivered at the coaling station, and their unrivalled adaptability to the purposes of ocean traffic. This statement will be denied with more or less vehemence by the agents of competitive fields, but is susceptible of such absolute demonstration as to answer every opposing claim.

The coals which might possibly compete for this canal trade with those from West Virginia may be divided into two general classes—foreign and domestic. In the former class are the coals of Great Britain, Australia, Japan,

China, Vancouver Island, South America and South Africa; in the latter those of Pennsylvania, Maryland, Virginia and Alabama.

The coals of Great Britain come from the mines in Wales, and are known, therefore, as Welsh coals. They have for years been the dominating factor in the steam-propelled traffic of the commerce between nations. Only recently, indeed, could even the government officials of this country be brought to recognize West Virginia coals as their equal for steaming purposes.

Numerous tests, however, have served to establish the fact that the New River and Pocahontas coals from West Virginia are, in all respects, the equals of the best of the Welsh product for steam making purposes, and that where forced draft is used they are superior. The Welsh coals are given a rating five per cent. higher than the West Virginia coals because they are generally better cleaned and prepared, but it is expected that with the larger demand in a competing market the West Virginia producers will give the same care and attention to their coals that the Welsh producers now give, thus wiping out the sole advantage now claimed by the latter. Putting them, therefore, on the same basis of steam-making potentiality, let us see then what advantages the West Virginia coals enjoy over those from Wales in the matter of competition for the trade at the Canal Zone.

The best Welsh coals bring a price ranging on the average from \$4.80 to \$4.92, f. o. b. Cardiff, exclusive of wharfage charges; the best dry coals from \$4.32 to \$4.56; the best Monmouth coals from \$3.92 to \$4.14. New River and Pocahontas coals laid down at Hampton Roads average from \$2.85 to \$3.00. It is 4,591 miles from Liverpool to Panama, while from Hampton Roads to the Isthmus is but 1,778 miles. Charter rates from Cardiff to Rio Janeiro average \$3.71; to Buenos Aires \$3.53; to Santos \$3.89. The average rates from Hampton Roads to Rio Janeiro are \$4.01. On these bases the cost of Welsh coal at Rio Janeiro would average \$8.63; of Pocahontas and New River coal, \$7.01.

It is not believable that the enterprising producers of the New River and Pocahontas fields will allow Welsh coal to take from them the great future markets to be developed by the digging of the Panama Canal, and in which they have such great natural advantage.

England has for many years enjoyed an advantage in ocean traffic in coal by reason of the fact that it could be sent to countries as ballast from which heavy cargoes were taken to England, such for instance as Chili, which shipped many thousands of tons of nitrates, and Argentine, which sent hundreds of thousands of bushels of wheat to Liverpool. But the day of dependence upon coal carried as ballast is rapidly passing. Manufacturers cannot afford to await the uncertain chance of receiving coal carried as ballast because of the want of a paying cargo, and the near future will see the bulk of the coal trade in the countries south of the Panama Canal go to those fields that can supply it with high grade coal at a certain time and at a fixed price.

Another competitor with the New River and Pocahontas coals is the Australian product. From Sydney to San Francisco is 6,522 miles, and to Valparaiso is 6,319 miles, as against 5,100 miles from Hampton Roads to San Francisco and 3,978 miles from Hampton Roads to Valparaiso. Here is an advantage of something like 1,500 miles which West Virginia coals enjoy. How about their analyses and heat-producing value as compared to the Australian product? Here are some figures:

Coal	Mois.	V.M.	F.C.	Ash	Sul.
Australian -----	1.92	39.50	54.08	2.91	0.541
New River -----	0.983	20.805	74.983	3.229	0.621

Tests in the comparative heating power of the two coals were made by the United States Navy Department. Using one cord of seasoned white oak wood as the unit of measurement the equivalents in coal were determined to be as follows:

Australian -----	Average, 7 tests, 2,225 lbs.
New River -----	Average, 19 tests, 1,676 lbs.

From this it appears that 1,000 pounds of New River coal equals as a producer of heat 1,327 pounds of Australian coal.

With superior coal and a shorter haul favoring the West Virginia mines it does not seem possible that they will yield the market to Australia.

Japan has a coal field of considerable extent, and her enterprising people, favored by equal natural conditions, would probably prove serious competitors with other coal producing nations. But the conditions are in no way equal to those of West Virginia. The coal is of a low grade, high in ash and sulphur, and low in fixed carbon. The story is told by the following analyses:

Coal	Mois.	V.M.	F.C.	Ash.	Sul.
Japan -----	5.06	44.36	40.81	8.75	1.39
New River -----	0.983	20.815	74.983	3.229	0.621

Even this low grade coal costs more at the mouth of the mine than does the New River coal, and it can easily be seen that, while it may sell in the far East, because of lower freight rates, it cannot compete with the West Virginia product in the markets of this continent.

Probably the coals from Van Couver Island will come nearer to being able to compete with those from West Virginia than those of any other country outside of England. Yet there seems to be little danger from that quarter. The analysis of the Van Couver product averages as follows:

Mois.	V.M.	F.C.	Ash.	Sul.
1.600	30.251	56.688	11.461	0.512

Experiments made by the Navy Department show that it takes 2,325 pounds of Van Couver coal to make as much heat as is produced by a cord of seasoned white oak wood, while only 1,676 pounds of New River coal is required to produce the same effect." In other words it will take 39 per cent. more of the Van Couver product to propel a ship a given distance than of the West Virginia. Van Couver coal free on board ship at the loading port costs from \$3 to \$4.50. The sailing distance to San Francisco is about 950 miles, and the charter rate about \$1.50, making the cost of the coal delivered at the American city from \$4.50 to \$6, more frequently the latter. Coal can be delivered there from the New River and Pocahontas fields for about \$1 more, but the value, measured by driving power, will be at least \$1.50 more, and therefore the West Virginia product will be cheaper in the long run. At all ports south of San Francisco the difference in favor of the West Virginia coals will be still greater.

Not only are the West Virginia coals cheaper, when their greater steam-making potentiality is taken into consideration, but because of that greater potentiality there is a great saving in bunker room to be gained by their use, a matter of much importance in the purchase of coal for ocean-going vessels.

South Africa is producing some coal, and under intelligent, modern management will doubtless largely increase

her output as the years go by, but it is believed by those who have studied conditions that time will bring too large a demand for this product closer home for it to become an important factor in serving the trade under consideration in this article.

Chili has a considerable coal area, but the output is dirty, of low heat-making potentiality, steams badly and deteriorates rapidly when brought into the open.

Venezuela is said to have a large amount of excellent coal, but it lies a long way from the coast, and it will probably be a good many years before its development will be such as to make it an important competitor in the world's markets.

China has vast areas of coal, but it is in the infancy of development, and its effect upon the world's supply can now only be surmised.

While actually belonging to the domestic supply, because lying inside the territory of the United States, yet to be classed with the coals treated of above, are those produced in Washington and Alaska. It is understood that there are enormous deposits of high class coal in Alaska, and it may in the future become a very important factor in the competitive field. But for the present and the immediate future the cost of production, together with the more than six thousand miles distance from the Panama Canal, removes the Alaska field from the necessity of consideration.

The State of Washington has some scattered coal areas, in which operations have been carried on to a limited extent for half a century, until the production has now reached something like 3,500,000 tons a year. The Washington coals, however, are high in ash and in moisture, and of very low heating capacity as compared with the West Virginia output.

Extensive experiments carried on by the Navy Department show that the New River coals have a heating value of 15,232 British thermal units, while the Washington coals show but 10,923. In other words, the value of a ton of New River coal, as measured by its heat producing power, is equal to almost a ton and a half of Washington coal. The mine-mouth value of the Washington product is about \$2.39; of the New River product about \$1. Washington is, therefore, eliminated from the circle of competition.

This brings us then to a consideration of what may be termed real domestic competition—the coals of Alabama, Maryland and Pennsylvania. The United States Census report for 1909 gives the capital investment per ton of annual production as \$3.17 in Alabama and \$2.64 in West Virginia. Value of coal at the mine, \$1.19 in Alabama and 86 cents in West Virginia. Cost of production, including wages, salaries, supplies, royalties, and miscellaneous expenses, \$1.12 in Alabama and 83½ cents in West Virginia. Alabama used 28 per cent. of its 1912 production of 16,100,600 tons in making coke for its own furnaces; West Virginia's consumption of its 66,786,687 tons in 1912 was less than ten per cent. The heating value of the New River and Pocahontas coals is considerably greater than that of the Alabama product, and when the two meet in a competitive market the Alabama coal must have some advantage of price, or it cannot win. Let us see what the facts are with respect to that matter.

To reach tidewater at Mobile the Alabama producers base their hopes upon self-propelling barges traversing the Black Warrior river, over a stretch of approximately 400 miles, through numerous locks which have a width of 125 feet, and with a depth of water of 6½ feet. Most of the coal must be hauled in cars to the water's edge and

there loaded on the barges, from which, after this uncertain journey of 400 miles, it must be reloaded into seafaring vessels and carried 1,376 miles to Colon, against the 1,778 mile route from Hampton Roads for the West Virginia coal.

With an advantage of 33 cents in value at the mouth of the mine, and the cheaper loading facilities at ship-side, West Virginia coal can be set afloat in sea-going vessels at sufficiently less cost than can the Alabama product to greatly more than offset the difference in carrying it 1,778 as against 1,376 miles.

To sum up the situation then as against Alabama, West Virginia will be able, at least for many years to come, to send to the Canal Zone a better steaming coal at slightly less cost. The genius and enterprise of this State's coal producers may be safely relied upon to do whatever else may be necessary to hold the market as against Alabama.

Pennsylvania, the State that produces more coal than any other of the United States, will hardly prove a formidable competitor of West Virginia in the trade to be developed by the building of the Panama Canal. Its bituminous coals are of the best quality—probably better than those of any other State except West Virginia, but its location is such that they find a better market at home in the contiguous State, in New England, on the Great Lakes and in Canada than will probably be developed elsewhere. The increasing demand in these markets, and the lack of proper facilities for loading ships in the New York harbor and others close by are such that they will doubtless become less and less a threatening competitor of the West Virginia product in the export and bunker trade. The access of these coals to ocean ports is over congested railroads, with terminals of such tremendous value that loading facilities equal to those accessible to West Virginia mines on Hampton Roads cannot, in the nature of things, be provided, and the most that the Pennsylvania producers can hope from ocean traffic is the purchase of such supplies as must be taken on to furnish steam to the next coaling station.

Maryland has some excellent coals, but they are limited in extent, and cannot supply the demands of the immediately surrounding markets. The State produces something like five million tons annually, but the mines in Central and Eastern West Virginia ship many more than that number right by the Maryland mines to various Eastern markets, including Baltimore.

Two regions that will doubtless prove competitors with West Virginia in the markets under consideration are Eastern Kentucky and Southwestern Virginia, but the developments there are too new and the resources not sufficiently known to form a basis for proper comparison at this time. Suffice it to say that the coals are of much the same quality, so far as developed, and the distances and transportation facilities practically identical, actually and potentially.

Another factor which will in time intervene to strengthen the hold of West Virginia upon the coal trade of the Canal is the river transportation being developed by the general government in the improvement of the Mississippi, the Ohio and tributary streams. The making of a permanent nine-foot stage of water in the Ohio from Pittsburgh to Cairo at all seasons of the year has become a settled part of the government policy of internal improvements, and work upon it is being carried forward at a rapid rate. The completion of this undertaking will make it possible to take coal from the mines of the Kanawha Valley in West Virginia to New Orleans at from

\$1.25 to \$1.50 per ton, thus enabling the producers to sell it in that market at from \$2.40 to \$2.65 a ton. From careful estimates it is believed it can be transported from New Orleans to Colon for \$1.00 a ton, making its price there from \$3.40 to \$3.65 a ton.

Supplementing the work being done on the Ohio is that on the Monongahela, the Great Kanawha, the Little Kanawha and the Big Sandy, its important tributaries in West Virginia, all of which streams are bordered by important coal fields, developed and undeveloped. With the completion of these improvements coal-laden barges will go out from all these streams into the Ohio, down that river to the Mississippi, and thence to the waters of the Gulf of Mexico, there to be reloaded into ocean-going craft, and so taken on to the markets of Panama and the growing and developing South. The Monongahela and the Great Kanawha have already been thus improved until each has a constant depth sufficient to carry coal barges, and millions of bushels are annually carried to market over the waters of each river.

The chief drawback to the river transportation of coal at present is the lack of facilities for shifting the coal from barge to ship. It is believed, however, that with the development of this means of transportation will come the building of a class of barges that can be sent direct from the mines on the Monongahela, the two Kanawhas and the Big Sandy to the coaling stations at Colon and Panama. When that is done this State will be able to deliver coal to the Canal Zone and the countries of South and

Central America at prices impossible of duplication by the product of any other coal field in the world.

The conclusions which Governor MacCorkle draws from his consideration of this subject are stated as follows:

"First. That West Virginia, with Western Pennsylvania, Eastern Kentucky and the Pocahontas field, will be able to sell coal more cheaply at the Isthmus Canal than any other State or country. That by reason of the rail and water route possessed by West Virginia and Eastern Kentucky these two sections will have the advantage over any other section or State.

"Second. That no great amount of South African, Australian or Japanese coal will be sold on this side of the Pacific. That in the market of San Francisco West Virginia coal, considering its quality and price, will be much cheaper than the Van Couver or Washington coal. That with the exception of ballast coal on the western coast of South America West Virginia will be able to furnish coal more cheaply than any other country or State. That the Canal will enlarge the demand for West Virginia coal, by reason of its cheapness and availability in creating new manufactories and new enterprises in the countries which have been debarred from both by reason of the high price of coal. That we will take the greater part of the coal trade now possessed by Australia and Great Britain in the markets of Mexico, Central America and both coasts of South America, and that the indirect effect of the Canal will be very great upon Virginia and West Virginia, if we are able to sell our coal in competition with the countries which are able to send return cargoes to our shores."

The Oil and Gas Fields of West Virginia.

The first petroleum known in the United States, so far as there is any record, was found on the shores of Seneca Lake, in the State of New York, where small quantities were collected and used as a medicine under the name of "Seneca Oil," both the Indians and the white settlers believing it possessed some efficacy as a liniment for rheumatism, sprains and bruises.

In the territory now known as West Virginia oil was first discovered in the valley of the Great Kanawha, where in the drilling or boring of salt wells small quantities were found early in the last century. Here for a time it was collected, barrelled and sent away to be sold to druggists for various uses, most of them medicinal. It was discovered on the waters of Hughes river, a tributary of the Little Kanawha, by the first white men who penetrated that section, and when it was found to be the real "Seneca Oil" pits were dug in the sand into which the oil would flow and from which it was dipped up to be sent to market. About 1825 it began to come into use as an illuminant, and soon the demand became great all over the country.

In 1835 George S. Lemon came from Lower Virginia and built a cabin at the forks of Hughes river, where he soon learned the value of the oil. Being a man of enterprise he engaged in collecting and selling it, and believing from the fact that oil was found there that salt brine was also present, sunk a well for the purpose of securing the brine that he might engage in salt making. He found the brine, but there was so much oil in the well that he abandoned the salt making project and turned his attention to pumping the petroleum. About the time Lemon

had demonstrated the profit of the undertaking Bushrod Creel came on the scene as rightful claimant of the land on which the oil was found, and engaged in the business of collecting and selling it for himself. His principal market was Marietta, Ohio, where his chief patrons seem to have been Bosworth, Wells & Company. From statistics taken from the books of this firm it appears that Creel's petroleum business amounted to \$238.95 in 1848; \$228.00 in 1849; \$230.00 in 1850; \$4,400.76 in 1851; \$2,216.15 in 1852; \$1,507.00 in 1853; \$394.00 in 1854; \$239.00 in 1855; \$1,220.00 in 1856; \$409.00 in 1857. There was no record for 1858-9, but for 1860 the sales were \$1,000.00. The price in 1855 was 33 cents per gallon, but by 1857 it had risen to 40 cents. The Marietta people sold the oil to druggists and chemists in Pittsburg, Baltimore, Cincinnati, New York and St. Louis, who doubtless put it on the market largely as a medicine.

First Real Development.

On the right bank of the Little Kanawha in what is now Wirt county, is a small stream that puts into the river not far from the mouth of Hughes river. This stream has long been known as Burning Springs Run, because near its mouth were two springs from which natural gas escaped, which when set on fire burned over a space of several square feet. In 1842 two brothers named Rathbone came from New York to Parkersburg, and not long afterwards purchased a tract of one thousand acres of land on the Little Kanawha river. The tract embraced Burning Springs Run. Fifteen years later, when salt making had become a leading industry on the Great Kan-

awha, the Rathbone brothers, having heard of a burning spring in that field at a place where salt brine was discovered, through the burning springs on their property indicated the presence of salt water, and so began drilling a well with the intention to make salt. At the depth of two hundred feet they found oil and installed a pump to get rid of it. Finding that they could secure several barrels of oil each twenty-four hours, they abandoned the idea of making salt, and turned their attention to oil. They interested other Parkersburg people in the business, and these, drilling about a quarter of a mile from the Rathbone well, at a depth of 303 feet struck a flow of oil that made 100 barrels a day. A third well was soon afterwards struck by the Rathbone Oil Company, which had been formed, and this being sent down to the Dunkard Sandstone, produced 1,200 barrels daily.

This great strike naturally caused widespread excitement, and within a very short space of time the town of Burning Springs rose near the spot whereon the well was struck, and soon had a population of 6,000 people. It was lighted by natural gas, and that fluid was utilized as a fuel both for domestic purposes and for generating steam. Fortunes were rapidly made and as rapidly lost in the furore of speculation that followed. Other wells were drilled in and hundreds of thousands of barrels of oil were sent down the Little Kanawha river on boats or rafts or adrift to Parkersburg and thence shipped to various markets. At times the cooerage became exhausted and the oil was dammed up in the beds of creeks or pumped in bulk into barges moored in the river. In May, 1863, hundreds of thousands of barrels of oil thus held was set on fire by a force of confederate soldiers and the whole of it destroyed.

Little was done in the way of further development in the field until the close of the Civil War, but there was a revival of business in 1865, and then a great deal of drilling was done in Wirt, Wood, and Pleasants counties, in all of which producing wells were drilled in. In 1876 there were said to be 292 wells in the State, the average production being about two barrels.

Second Era of Production.

From 1876 to 1889 there was little extension of the oil field. A great deal of money was spent in drilling outside the area of known production, but with little results. Finally about 1889 the conclusion was reached that the wells were not deep enough—that there was oil to be found far under the sands which had thus far been penetrated. New appliances were invented and new machinery installed for deeper drilling, and the consequence was the development of the Doll's Run, Eureka and Sistersville field, the first to produce from the deeper sands. From that time to the present there has been an ever-widening development throughout the State, and the production of oil has risen into the millions of barrels per annum.

Oil is now being produced in the counties of Boone, Braxton, Brooke, Cabell, Calhoun, Clay, Doddridge, Gilmer, Hancock, Harrison, Jackson, Kanawha, Lewis, Lincoln, Logan, Marion, Marshall, Mason, Monongalia, Ohio, Pleasants, Putnam, Ritchie, Roane, Taylor, Tyler, Upshur, Wayne, Wetzel, Wirt, Wood. During the time from the beginning of production in the State to 1876 it is calculated that 3,000,000 barrels of oil had been produced. From 1876 to 1889 the amount was 1,783,448 barrels, from 1889 to 1903 it was 139,908,678 barrels, and from 1903 to 1914 it was 93,505,144 barrels. The highest mark was reached in 1900, when the output was 16,195,678 barrels. But new

fields are being discovered and exploited every now and again, and no man can say that the limit of annual production has yet been reached in West Virginia. New methods are being adopted for reviving the production from old wells, and the oil business bids fair to rank high among the State's enterprises for many years to come.

The quality of the output in West Virginia is of the highest, and the price it brings averages higher than for the product of any other field.

Production of Natural Gas.

The first authentic story of the discovery of natural gas in what is now West Virginia is contained in the writings of a traveler who, in 1750, was endeavoring to reach the Fairfax Stone, now in Tucker county. He tells of reaching a small stream, "four poles wide and knee deep," in the middle of which "there was a constant bubbling of waters as if a blow-pipe was at work at the bottom. The wind came up with a smell similar to that of a stone-coal fire. The guide waded in, held the lock of his rifle near the bubbling part of the surface, and pulled the trigger. It flashed, and at that instant a fire was blazing on the surface of the water as large as a yard square and two feet high."

In numerous places such bubblings of gas were found at various times, and "burning springs" were common to many localities. The first gas ever struck in the State below the surface was in a well drilled within the present limits of the City of Charleston by Captain James Wilson, in 1815, in the search for salt water. Not finding the brine at the depth expected, Captain Wilson declared he would find it if he had to drill into a hotter climate, and so sent the well on down. Finally a pocket was struck from which came an immense flow of gas and salt water. From a nearby fire the gas became ignited and blazed up with great force, and the drilling was stopped. Seventy-five years later the gas was still coming up at that spot and could be ignited by anybody who cared to see it burn. Gas was later found in large quantities in the wells drilled for salt water at various places in the Great Kanawha Valley and in 1841 William Tompkins, a salt maker of that day, piped the flow from one of his wells and used it as fuel for evaporating the water in the process of salt making. This was the first use of natural gas as a fuel for manufacturing purposes anywhere in the United States. Thenceforth it was for some years the principal fuel used in salt making in the Great Kanawha Valley.

Prior to 1882 all the natural gas known in the State was discovered in drilling for salt or oil, and no systematic effort was made to develop it as a separate product. But about that time its great value as a fuel became established, and production of gas has become a distinct business.

Natural gas is now commercially produced by 22 States, but of the total of more than 5,000,000,000 cubic feet marketed annually West Virginia produces about forty per cent., or something in excess of two billion feet. Of this about sixty per cent. is transported in pipe lines into other States and there consumed in lighting towns and cities, in heating homes and public buildings, and in feeding the fires of hundreds of manufacturing plants. The figures given do not include the gas utilized by the drillers, or that which escapes unused and unmeasured, which has been estimated to be half a billion cubic feet daily. The value of the gas annually transported beyond the boundaries of the State is estimated to be about thirty million dollars. There are about five thousand producing

wells in the State, distributed through 33 counties. These are Boone, Brooke, Cabell, Calhoun, Clay, Doddridge, Fayette, Gilmer, Hancock, Harrison, Kanawha, Lewis, Lincoln, Marion, Marshall, Mingo, Monongalia, Nicholas, Ohio, Pleasants, Putnam, Ritchie, Roane, Taylor, Tyler, Upshur, Wayne, Wetzel, Wirt and Wood.

In addition to these producing counties, it is thought by geologists that pools of commercial value may finally be developed in Preston, Barbour, Randolph, Webster, Raleigh, Wyoming and McDowell counties.

The development of the natural gas production has given an immense impetus to numerous phases of manufacturing in West Virginia. As a fuel for use in certain lines of manufactures it is unapproachable, both by reason of its convenience in handling and its freedom from ash and other refuse. Glass factories have sprung up in a number of places, and West Virginia is rapidly assuming a leading position in that line of manufacture. Potteries have been established on a large scale, and from a position entirely negligible in that industry West Virginia has come to be second of the States. Steel plants of immense proportion are at work in several cities of the State, and the largest independent tin plate mill in the world lights its fires with West Virginia gas on West Virginia soil. Likewise the largest axe factory in the world was induced to come to West Virginia by reason of the immense supply of gas and its unusually high quality as

measured by heat units. Chemical works of great size, and various other manufacturing establishments using large quantities of fuel, and the nature of whose business makes natural gas the most adaptable to its purposes, have come into the State and are doing their part to add to its progress and prosperity. Possibly no other single factor has contributed in larger measure to the advance which West Virginia has made along industrial lines within the last decade than has its immense resources of natural gas.

Manufacturing Carbon Black.

An important industry growing out of the development of natural gas in West Virginia is the manufacture of carbon black, or "lamp black" as it is more frequently called. This article, used very largely all over the world, is made from gas at the wells the product from which is not otherwise utilized, and has proved to be the source of considerable profit to the manufacturers.

The principal plants for making carbon black are in Calhoun, Wirt, Clay, Kanawha, Lewis and Logan counties. About 90 per cent. of all the carbon black produced in the United States is now made in West Virginia. In addition to furnishing practically all used in this country, (and it amounts to many hundreds of thousands of pounds annually), a large part of the product goes to export, bringing back many foreign dollars to enrich the arteries of West Virginia's trade.

West Virginia's Rich Deposits of Stones and Ores.

Many citizens of this commonwealth have spent much time and labor in a fruitless search for gold, silver, copper, lead, and other rare metals, and do not seem to understand why commercial deposits of these substances cannot exist in West Virginia as well as in any other region of the country. The reason for their absence in paying quantity is that the sedimentary beds which make up the surface rocks of the State are comparatively unchanged; no extensive faults or displacements of the strata occur; no great igneous, or volcanic intrusions have disrupted the orderly succession of the rocky beds; and no intense heat has baked them to the condition of the old crystalline envelope from which so many of the rarer metals have been derived.

The column of rock exposed within the State consists mostly of sandstones, limestones, and shales, instead of granites, marbles, roofing slates, quartzites, quartz veins, etc., in connection with which the precious metals are always found, either directly or derivatively. The very oldest rocks of the globe, which are nearly always much baked and changed as though by intense heat so as to be converted into a semi-vitreous or crystalline condition, and in which the precious metals so frequently occur, either do not exist in West Virginia, or they are covered so deep by the later formations that only along the extreme southeastern border of the State, in Jefferson county, along the great folds or arches of the Blue Ridge mountains, do they get near the surface.

It is the absence of these hard and almost insoluble crystalline rocks from the surface of West Virginia, and the presence of the softer sandstones, shales, and soluble limestones, all of which readily break down into a thick, porous covering under the disintegrating effects of sunshine and frost, wind and rain, that constitute the great difference between our soils and those of the New Eng-

land States, where only the crystalline rocks occur, and where the valuable soils are confined almost entirely to the alluvial or transported deposits of the river valleys and their tributaries.

Limestones.

One of the rich mineral resources of West Virginia is her vast deposits of limestone which cover large areas of the State, making the rich wheat lands of the Shenandoah Valley in Berkeley and Jefferson, as well as the fine agriculture and horticulture lands of Morgan, Hampshire, Hardy, Pendleton, Mineral, and Grant counties east of the Allegheny mountains and a broad belt along the western slopes of the same through Pocahontas, Greenbrier, Monroe, Mercer, Preston, Tucker, Randolph and Webster, where the richest of blue grass pastures spring up spontaneously. In these regions belts of almost solid limestone, practically unmixed with shales, stretch for many miles in length and often several miles in breadth entirely through some of the counties named. In other regions of the State like Ohio, Brooke, Marshall, Marion, Monongalia, Harrison, Lewis, and portions of Barbour, Upshur, Gilmer, Doddridge, Wetzel, Tyler, Pleasants, Ritchie, Wood, Roane, Jackson and other counties the limestones are interstratified with thick beds of shale, whose decomposition, along with the limestone layers, yields very fertile soils well adapted to nearly every form of agriculture, horticulture, and animal industry, much of these areas being specially valuable for the growth of the finest grades of merino wool, so that the limestones of the State have an immense value in the making of soils aside from their direct values as minerals in the manufacture of lime for every purpose, being used as fluxes for glass sands, iron and other ores, as well as ballast for railways, macadam for highways, etc.

The great limestone quarries in the vicinity of Martinsburg, Berkeley county, Engles, Bakerton, and other points in Jefferson county, supply an enormous amount of lime and limestone of the highest grade, and give employment to a large number of people. These quarries are all in one of the oldest limestone formations, known as the Shenandoah Limestone of the Cambrian and Ordovician systems, down near the lowest portion of the geological column exposed anywhere in the State. This Shenandoah limestone zone is brought to the surface only in Berkeley and Jefferson, and in a small portion of Hardy and Pendleton counties, since everywhere west of the Alleghenies these limestones would underlie the surface at a depth of one and a half to three miles, depending upon the distance from the eastern line of the State along which this interval would be least.

These quarries in the pure limestone at Martinsburg, Bakerton and elsewhere in Berkeley and Jefferson appear to come at about the same horizons in the Shenandoah limestone deposits as the extensive quarries in Center county, Pennsylvania, near Tyrone. The quality of much of this high grade limestone is shown by the following analysis:

	Per Cent.
Lime Carbonate.....	98.98
Magnesium Carbonate.....	0.43
Silica.....	0.58
Alumina.....	0.13
Iron Oxide.....	0.75

Silurian and Devonian Limestones.

The limestone deposits which lie west from the Shenandoah Valley belong several thousand feet higher in the geologic series, except a patch several miles long and a mile or two wide in Hardy and Pendleton counties, where the Shenandoah beds reach the surface along the crest of a great arch. These later limestones and limy flints which make the fertile soils and splendid peach and apple lands of Morgan, Hampshire, Hardy, Mineral, Grant and Pocahontas, belong in the upper half of the Silurian and the basal portion of the Devonian measures. These limestones are not quite so pure as some portions of those in Berkeley and Jefferson, but they contain vast quantities of rock most excellent for burning into lime for fertilizing, building and other ordinary purposes, as well as some strata that are fairly pure, as witness the following analysis from a quarry near Keyser:

	Per Cent.
Lime Carbonate.....	98.94
Magnesium Carbonate.....	0.68
Silica.....	0.49
Iron and Alumina.....	0.40

The Greenbrier Limestone.

On top of the Allegheny mountain plateau and just west from the main ridge of that great uplift across Preston, Tucker, Randolph, Pocahontas, Greenbrier, Monroe, and Mercer counties, getting thicker as we go southwestward, we find another great limestone deposit lying far above the Silurian and Devonian limestones of Mineral and Hardy counties. This limestone deposit which is known as the "Big Lime" of the oil and gas wells drillers, the Mountain or Greenbrier limestone of geologists, is the same one which is manufactured into cement at Manheim in Preston county, and quarried for ballast at Sturgis on Deckers creek, Monongalia county, at both of which

localities it is only 100 to 150 feet thick, but which increasing greatly to the southwest attains to 1000 feet in Pocahontas, 1200 feet in Greenbrier, and to probably 2000 feet in Mercer county, near the southwestern corner of the State. This great limestone deposit and the limy red shales above (Mauch Chunk) make splendid grazing and agricultural lands, wherever their outcrops, occur entirely across the State, and some of the limestone layers are sufficiently pure to serve as excellent fluxes for iron ores, and any other purposes for which a very white lime is not necessary. The cement made from the several layers of this formation at Manheim, Preston county, without any admixture of shale or other extraneous materials, is of a quality apparently quite as good as that manufactured in eastern Pennsylvania from the Shenandoah limestone.

The following analysis of a sample of the Greenbrier limestone from Deckers creek, Monongalia county, will illustrate the composition of the purer layers of that formation, not only there but elsewhere in the State:

	Per Cent.
Lime Carbonate.....	94.98
Magnesium Carbonate.....	1.38
Silica.....	3.31
Alumina.....	0.75
Iron Oxide.....	1.03
Titanium.....	0.04

Monongahela and Dunkard Limestones.

In addition to these thick limestone formations which crop to the surface over the southeastern half of the State, other and thinner limestones crop over the northern tier of counties, viz: Lewis, Harrison, western Marion, Monongalia, Wetzel, Doddridge, Tyler, Marshall, Ohio and Brooke, as well as in smaller areas over other counties southwestward from these, adding greatly to the fertility of the soil.

These limestones are generally in layers only 1 to 2 feet thick, and often separated by limy shales from ½ to 1 foot in thickness, and they belong in the Monongahela and overlying Dunkard series. Many of the layers are impure, containing much earthy matter as well as magnesium carbonate, but some of them, like the Upper Washington in Ohio county, are fairly pure, as illustrated by the following analysis of a sample of this formation in Ohio county:

	Per Cent.
Lime Carbonate.....	92.42
Magnesium Carbonate.....	0.91
Silica.....	5.00
Oxides of Iron and Alumina.....	1.60

Glass Sands.

West Virginia has immense deposits of the finest quality of glass sand. Although this industry is yet in its infancy within her borders, she stands second in glass sand production, her output footing up 268,368 short tons, Pennsylvania being first with 478,089 tons, and Illinois third, with 251,907 tons, these three States supplying nearly two-thirds of all the glass sand produced in the United States during the year 1911.

The main quarries for glass sand are located in Morgan county in the vicinity of Berkeley Springs, where the stratum mostly operated on is the Oriskany sandstone near the base of the Devonian system and 100 to 150 feet in thickness. The No. 1 sand produced in Morgan county from this great Oriskany deposit is used all over the east for the manufacture of the highest grade of glass ware

and the following analyses made in the laboratory of the State Geological Survey show the quality of this sand:

	Per Cent.
Silica -----	99.256
Iron Oxide -----	.0496
Alumina -----	.4692

This same great ledge of sandstone extends southward many miles from the vicinity of Berkeley Springs, but railway facilities for shipment have not yet been provided. Whenever these can be furnished, the output of Oriskany glass sand from West Virginia could be increased indefinitely. This geological formation also crops to the surface in Hampshire, Mineral, Hardy, Pendleton, Grant and Pocahontas in lines of cliffs hundreds of miles in linear extent, and doubtless at many localities within the counties named first-class glass sand may be obtained when shipping facilities have been provided. It is this same geological horizon that produces such large quantities of glass sand along the Juniata river in Pennsylvania.

Another great white sand deposit belonging at the base of the Silurian system, viz: the Medina White Sandstone, has also been quarried for glass sand in Morgan county, one mile and a half west from Berkeley Springs, and the product gave the following analysis in the Survey laboratory:

	Per Cent.
Silica -----	99.86
Iron Oxide -----	0.06
Alumina -----	0.23

A vast area of this stone is accessible east from the Allegheny mountains through the counties of Mineral, Morgan, Berkeley, Hardy, Pendleton, Grant and Pocahontas, so that a fine quality of very pure glass sand from this formation as well as from the Oriskany beds will be one of West Virginia's mineral resources to a very remote date in the future.

Much higher in the geological column, viz: in the Pottsville beds of the Carboniferous system there also occur vast deposits of excellent glass sand. True, these are not of such high grade as the Oriskany deposit of Morgan county, since they contain more impurities principally in the shape of alumina, but nevertheless these Pottsville sands can be used for all of the common grades of glass, like window, bottle, etc. These deposits have so far been mined principally near Corinth in Preston, Sturgis in Monongalia, and Craddock in Upshur county, where the washed sands have the following composition as determined by the W. Va. Geological Survey:

	(1)	(2)	(3)	(4)	(5)
Silica -----	98.20	98.950	99.15	98.82	99.200
Iron Oxide -----	0.0457	0.048	0.0383	0.1183	0.0708
Alumina --	1.5705	1.112	0.6517	0.8217	0.6492

Building Stone.

No State in the Union contains more varieties of sandstone adapted for building purposes than West Virginia. These sandstones are especially numerous and valuable in the Carboniferous system, ranging from the Pocono or Big Injun sand at the base of the Carboniferous up to the top of the Dunkard or Permo-Carboniferous series. Their crushing strength varies from 5,000 to 8,000 pounds to the square inch for those in the Dunkard series, to 24,000 as tested in the reddish brown stone of the Lower Carboniferous, of the Hinton region, Summers county. These

building stones occur over a wide area entirely across the State wherever the Coal measure and other Carboniferous rocks extend. Recently large shipments of building stone from one of the Preston county's sandstone quarries in the Conemaugh series have been going into one of New York City's greatest cathedrals and other costly structures.

Brick, Clays and Shales.

The under clays that accompany the coal beds of Pennsylvania are also present at the corresponding horizons in West Virginia, and in Hancock, Marion and Taylor counties especially have given origin to large industries in the manufacture of Fire, building, and paving brick, tile, etc., and the great shale beds of the Conemaugh series are extensively operated for the manufacture of common building and paving brick at many points in the State, while at Huntington an excellent quality of red roofing tile is manufactured from these shales. There are also vast deposits of surface clays in nearly every county of the State, and these, together with the ever present shales in every geological formation, should with its cheap coal and natural gas, make West Virginia's output of brick and clay products the greatest of any State in the Union.

Salt Brines.

No deposits of rock salt have yet been penetrated by the drill in West Virginia. It is possible that when a hole has been sunk in the earth to the horizon of the Salina geological formation which holds the great deposits of rock salt in western New York, northwestern Pennsylvania, and northern Ohio, the same deposits may be revealed, but as they would underlie the surface at nearly a mile depth anywhere along the Ohio river at the western boundary of the State, such deposits, if any exist, cannot now be considered available. Where the Salina formation comes to the surface on Limestone run, near Keyser, Mineral county, springs containing some salt issue from it, and in the early history of the region furnished a small amount of salt to the primitive settlers, so that it is barely possible that a great deposit of rock salt may underlie all of West Virginia from the Allegheny mountain range westward, but as it is buried under from one to three miles of rock strata, it can only become available for use in the remote future.

The salt industry of the State is carried on at present by the concentration of brines obtained from boring into the basal beds of the Pottsville series, and also into the Big Injun of Pocono beds below, both of which horizons belong in the Carboniferous system. The manufacture of salt from these brines is confined to the Ohio river in Mason county, and to the Great Kanawha in Kanawha county, although brines of equal strength and abundant quality may be obtained by drilling in nearly every region of the State west from the Allegheny mountain range, brines of very great salinity having recently been found in the Oriskany sandstone at a depth of about 4000 feet in a boring made at Parsons, Tucker county, by the Parsons Pulp & Paper Company, and in the Salina beds of the Silurian at a depth of more than a mile (5,850 feet) in the deep well drilled by Wm. Seymour Edwards on Slaughter's creek near Coalburg, Kanawha county. Hence there are plenty of brines in the State accessible at all depths for the establishment of many more salt manufacturing and chemical industries.

Iron Ores.

West Virginia, although having probably 300 million tons of available iron ore within her borders, produces such a small amount annually that her production is connected up with that of Kentucky in the statistics published by the U. S. G. Survey. For the year 1911 the production of both States amounted to only 71,979 long tons, of which 57,770 was hematite ore produced by the Rose Run mine near Olympia, Ky., and the balance of 14,209 tons was iron ore produced at Orebank, 4 miles up the Potomac river from Harpers Ferry in Jefferson county, W. Va., where a mine on the south bank of the river has been in almost constant operation for nearly a century. This is the only operating iron ore mine in the State at the present time.

This is primarily due to two causes, the principal of which is lack of transportation facilities, the ore deposits

being usually situated in wild, mountainous regions, remote from railways, and therefore inaccessible for commercial mining purposes. The other cause is that very little of West Virginia's iron ore is fitted for the manufacture of steel by the Bessemer process and hence there has been no such demand for these ores within the last three decades as would lead to their exploitation, and the building of railways to carry them to market.

Aside from the small deposits of carbonate ores always occurring in connection with the Coal Measure rocks, the principal deposits of iron ore in West Virginia are found east of the Allegheny mountains in the counties of Jefferson, Berkeley, Morgan, Hampshire, Mineral, Grant, Hardy, Pendleton, Pocahontas, Greenbrier, and Monroe.

With the rapidly increasing use of iron and steel these ores must be brought into demand in the near future, thus becoming another valuable asset to this State of surpassing richness of resources.

Forests and the Lumber Industry.

By A. B. Brooks.

The forests of West Virginia, as in other States of the same general region, are composed of a large number of useful and interesting species of trees.* The State's great range in altitude of 4,600 feet, which is equivalent to about 15 degrees of latitude; the variety of soils, including the rich alluvium of river bottoms, the numerous clays of hills and plateaus, the cool rich loams of coves and north hillsides, the dry sands of mountain ridges, the shales of the northeastern counties, and the deep humus-filled soils of upland glades, are favorable to the existence of a great diversity of tree life. The geographic position, the topography, and the elevation of the State are such, indeed, that a very large percentage of the species of trees that are indigenous to the northern States east of the Rocky Mountains and as far south as the southern border of Virginia find extensive areas of adaptability for their healthy existence. The Allegheny Mountain region admits several species of cone-bearing trees that belong, primarily, to southern Canada and the States of the extreme northeast; the low, fertile Potomac valleys provide suitable conditions for many of the trees of the Atlantic coast region; and the large westward-sloping, trans-Appalachian portion of the State, with its numerous low valleys and hills, meets the requirements of many of the trees that belong to the sub-tropical and middle western regions of the United States.

The trees of the Atlantic slope are small, compared with the giant Sequoias and others of the Pacific coast, yet the excellence of their lumber and the ease with which they can be handled are factors that place them in the front rank among the valuable timber trees of the country. The size and excellence of West Virginia trees early attracted the attention of the explorer and fortune-seeker, Christopher Gist, who was sent out from Virginia as an exploring agent of the Ohio Company, visited the Ohio River Valley in West Virginia in 1751 and again in 1752. Under date of February 24, 1751, while camped in the valley of the Ohio some distance south of the Great Kanawha's mouth, this explorer made the following entry in his journal: "The bottoms are about 1½ miles wide, full of lofty timber."

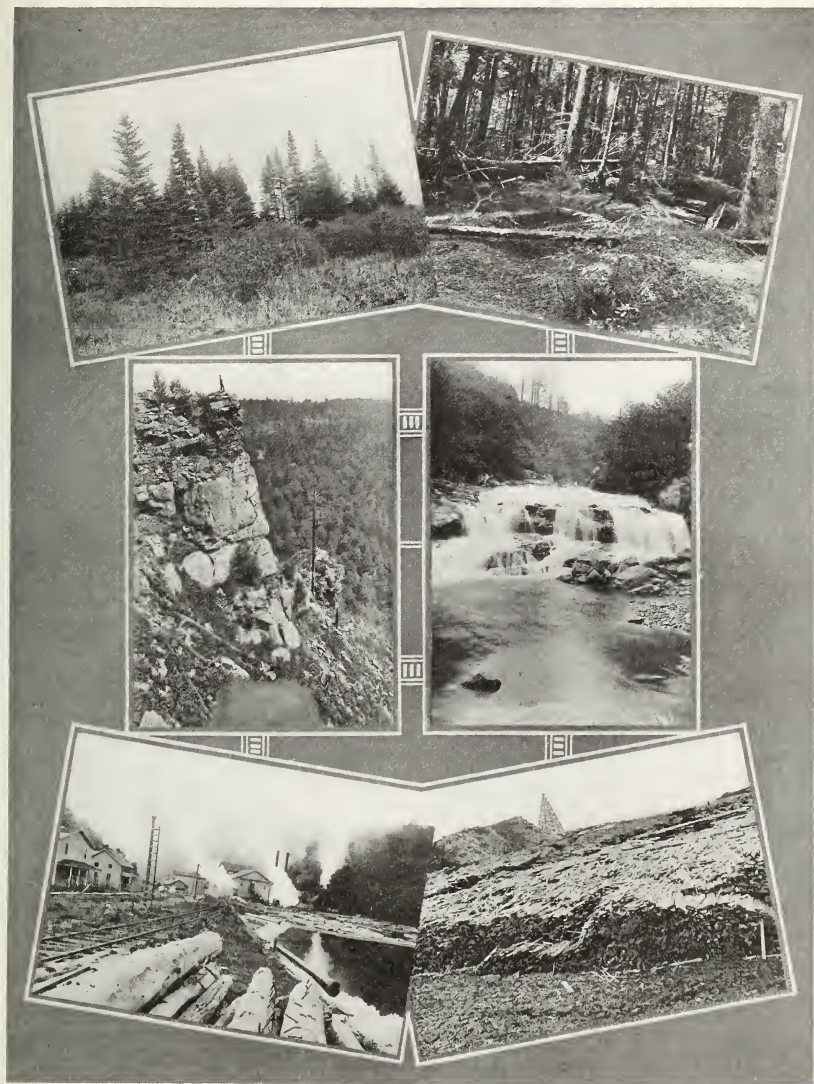
Washington was a frequent observer of our trees. On November 4, 1770, he was in the valley of the Great Kanawha, in what is now Mason county, and wrote in his diary for that day: "Just as we came to the hills we met with a sycamore about sixty yards from the river of a most extraordinary size; it measuring, three feet from the ground, forty-five feet around, lacking two inches; and not fifty yards from it was another, thirty-one feet around." Entries of this nature are numerous in Washington's journal, as well as in those of other explorers of early years.

Present-day lumbermen and timber cruisers tell us of examples of mammoth trees that once stood in various sections of the State. A figured black walnut, said to have measured 7 feet in diameter and 80 feet to the first limb, was cut in Logan county; a yellow poplar, of about the same dimensions was recently cut in Wetzel county, and another tree of this species, once growing in Putnam county, is said to have measured 10 feet in diameter, with a trunk that held its size, with not more than normal taper, for over 75 feet.

At one time, within the present limits of West Virginia a forest cover was spread over the whole area of more than 15½ million acres. There was an open glade here and there, and in the days when only savages held possession of this territory a few small cornfields might have been observed in the river valleys. The early explorer and pioneer settler, as he reached the summit of mountain after mountain in his progress toward the west, saw before his eyes, as it were, a sea of verdant forest bounded only by the limits of his vision. Such a forest is no longer to be seen. The farmer and the lumberman have been at work clearing the land to make room for agriculture and to supply the needs of the rapidly-increasing population.

The amount of timber cut and used for various purposes prior to 1880 is not known. Much that was cut before the Civil War period was used for domestic purposes. Some was sold in markets that could be reached by water and a little was shipped on the first railroads. One estimate puts the quantity used at home for building purposes, during the whole time before 1880, at 500 million feet. The cut of saw mills during the past thirty-five

*NOTE:—See list of trees at end of this article.



Balsam Fir in Tucker County.

Forest on Upper Cheat.

Mill on the Greenbrier.

Virgin Spruce and Beech.

Scene on the Little Blackwater.

Pile of Pulp Wood.

years has been about 20 billion feet. This does not take into account the vast quantity of timber cut for telephone and telegraph poles, cross ties, tan bark, pulp, fuel, and for other minor purposes. The figures below show how rapidly the production of lumber has increased during the periods given:

Year	Feet Board Measure
1880 -----	180,120,000
1890 -----	301,958,000
1900 -----	778,051,000
1907 -----	1,395,875,000
1909 -----	1,472,942,000

High water mark was reached in West Virginia, and all over the country, in 1909. Since that date production has been slowly decreasing. Following is the cut of the saw mills for three years since that date:

Year	Feet Board Measure
1911 -----	1,387,786,000
1912 -----	1,318,732,000
1913 -----	1,249,559,000

Evolution of the Saw Mill.

The remarkable evolution of devices for the manufacture of lumber is one of the best measures of the development of forest and timber industries. The adz and broad-axe and frow, with which the puncheon and boards were shaped for the first log houses, were the forerunners of the whip-saw and the old-fashioned water saw mill. These, in turn, were followed by the portable steam saw mill and the modern stationary band-saw mill. The primitive types of mills were put in operation in the State about the year 1755, or perhaps a little earlier. The application of steam power in the manufacture of lumber was the beginning of a much greater industry, carried on in all parts of the State by portable mills, and the introduction of the mammoth band saws, about 1881, practically revolutionized the lumber industry. The saw mills in West Virginia probably reached their maximum number and production about the year 1910, when there were no fewer than 1,524 in operation. Thirty-five years ago there was not a single band-saw mill in the State. In 1910 there were eighty-three mills of this kind. Thirty years hence they will probably all be closed down or moved to other States. The figures below show the rapid development of the band-saw industry in West Virginia and its no less rapid decline from the date given:

Date	No. Band-saw Mills Running
1880 -----	0
1885 -----	4
1890 -----	9
1895 -----	13
1900 -----	23
1905 -----	46
1910 -----	83

Date	Approximate No. of Band-saw mills that will be running
1915 -----	41
1920 -----	23
1925 -----	9
1930 -----	5
1935 -----	3
1940 -----	0

During the years when the more primitive types of mills were running, and continuing in some cases to the present

time, were other forest industries of considerable importance. The list of these industries includes the making and floating of flat-boats, the rafting of logs and other timber products, the manufacture of cooperage stock, the hoop-pole industry, shingle-making, the telephone and telegraph pole and cross-tie industries, tanning, and others of less importance. In later times the manufacture of pulp and paper has become one of the leading forest industries.

That the area of original forest in the State has decreased in proportion to the increase in number and capacity of the saw mills is a natural and correct inference. The amount of lumber cut on the old water-power saw mills and the amount rafted out, and that used for various other purposes, made only a small beginning on the margin of the great forests of the State. Even as late as the year 1880 the great body of coniferous and hardwood forests of the interior sections had scarcely been touched. At that date only strips of varying widths had been cut along the Ohio river and its larger tributaries in the State, and along the North and South Branches of the Potomac river and along the Shenandoah river. But since the coming of the larger mills and the building of additional railroads, the area of virgin forest has been reduced to less than one-tenth its original size. Yet enough remain to support an enormous industry. According to the latest report of the West Virginia Commissioner of Labor, the lumber industry ranks first in importance of all the industries of the State. We have an estimate that there are 14,000 men, earning about 9 million dollars a year, engaged in operating the band-saw mills alone. Add to this number 5,000 men who work on smaller operations, 5,000 in planing mills and other wood-working establishments, and 2,000 more in tanneries, pulp mills, chemical factories, etc., and we have a total of 26,000 men earning approximately 16 million dollars a year. The forests of the State are such in kind that even the reduced area, if properly managed and protected, would yield an annual increment sufficient to support this great industry for an indefinite period.

The forest and timber industries—beginning in a small way with the earliest settlements of the State, and increasing to the present large proportions—have meant more in the way of benefits to the citizens of West Virginia than any other industry except that of farming. All classes of people have been, and still continue to be, the beneficiaries of these forest industries. Unlike the coal and oil, and many minerals that are buried out of sight in the earth, forests are placed within easy reach, and unlike them are capable of growth and renewal at such a rate as to increase their value a thousand fold over the non-renewable treasures beneath.

Have Brought in Much Capital.

The forest industries have not only brought capital into the State and afforded employment to thousands of its citizens, but have also been the means of establishing centers of population and of developing natural resources. Hundreds of small villages and flourishing larger towns today stand where lumber camps formerly stood, built long ago in dense wooded regions. In these camps a rough but large-hearted, robust, and fair-play-loving company of young lumbermen—some from the rural homes of our State and others from outside our borders—constituted the first temporary and shifting population of these centers, a few lingering behind as the first permanent resi-

dents. In many instances, where the ownership of large tracts of timber has fallen into the hands of a single company, the first small operations have given place to enormous mills which still furnish employment to the entire population of the prosperous towns that have grown up around them.

The forests of West Virginia serve many purposes aside from supplying lumber for the building of houses and ships and cars, and for other purposes where the manufactured product alone is used. They prevent the washing of soils from cultivated lands, where they are needed, into rivers and harbors, where they hinder navigation; they hold the water of rains and melting snows and give it out gradually to the springs that regulate the flow of creeks and rivers; they furnish a place for healthful recreation to hunters and fishermen, to collectors and students, and to thousands of persons who enter them in quest of a restful influence that can be found in no other part of Nature; they shelter and provide homes for multitudes of beneficial mammals and birds; and they act as shelters from winds, as modifiers of climates, and as beautifiers of landscapes.

List of West Virginia Trees.

The trees listed below have been observed by the writer, except those marked with an asterisk. These are taken from Millsbaugh's "Living and Fossil Flora," Vol. V (A), W. Va. Geological Survey, 1913.

WHITE PINE (*Pinus strobus*) Once growing in quantities in Greenbrier, Pocahontas, Tucker, Mercer, and Raleigh counties. Scattered locally in other parts of the State.

PITCH PINE (*Pinus rigida*) Common on dry hills in many sections but especially in the counties east of the Allegheny Mountains.

YELLOW PINE (*Pinus echinata*) sparsely distributed on both sides of the Alleghenies. Once more abundant and of fine quality.

SCRUB PINE (*Pinus Virginiana*) Abundant east of the mountains and scattered in other parts of the State.

TABLE MOUNTAIN PINE (*Pinus pungens*) Found scattered sparingly with other pines in the Eastern Panhandle.

TAMARACK (*Larix Americana*) A rare tree. Found only near Cranestown, Preston county.

RED SPRUCE (*Picea rubens*) A tree of high mountains, found in more or less small areas from Preston to Greenbrier county.

HEMLOCK (*Tsuga Canadensis*) A common timber tree, growing in nearly all parts of West Virginia.

BALSAM FIR (*Abies Fraseri*) A tree of mountains, rare in this State. Observed only in Randolph, Greenbrier, and Tucker counties.

WHITE CEDAR (*Thuja occidentalis*) Growing in the State only on the upper courses of the tributaries of the Potomac.

RED CEDAR (*Juniperus Virginiana*) Common in the eastern part of the State, along the Great Kanawha, and in a few other places.

JUNIPER (*) (*Juniperus communis*) Dry hills in Wood, Mineral, and Fayette counties.

WHITE WALNUT (*Juglans cinerea*) A common tree in all parts of the State.

BLACK WALNUT (*Juglans nigra*) Common throughout the State.

BITTERNUT HICKORY (*Hicoria minima*) Sparingly scattered in nearly all counties, but nowhere abundant.

SHELLBARK HICKORY (*Hicoria ovata*) The best-known and one of our commonest hickories.

BIG SHELLBARK HICKORY (*Hicoria laciniata*) Found in Ohio river bottoms.

BIG BUD HICKORY (*Hicoria alba*) Frequent throughout the State, though not as abundant as some of the other hickories.

PIGNOT HICKORY (*Hicoria glabra*) One of our commonest trees.

SMALL-FRUITED PIGNUT HICKORY (*) (*Hicoria microcarpa*) Fayette county.

QUAKING ASP (*Populus tremuloides*) Found in the higher counties.

GREAT-TOOTHED POPLAR (*Populus grandidentata*) Not common. Few found in the more elevated sections.

COTTONWOOD (*Populus deltoides*) Found in the Eastern Panhandle counties.

BLACK WILLOW (*Salix nigra*) Abundant along streams.

WATER BEECH (*Carpinus Carolina*) Common along streams.

IRON WOOD (*Ostrya Virginiana*) A common small tree in many sections.

BLACK BIRCH (*Betula lenta*) The common sweet birch of the State.

YELLOW BIRCH (*Betula lutea*) Frequent in mountainous parts.

RIVER BIRCH (*Betula nigra*) Found along streams in some parts of the State.

BEECH (*Fagus Americana*) Abundant west of the Alleghenies.

CHESTNUT (*Castanea dentata*) Abundant in most parts of the State. Now dying in large numbers from a disease of the bark caused by a fungus.

CHINQUAPIN (*Castanea pumila*) Not widely distributed. Found in southern and some of the eastern counties.

RED OAK (*Quercus rubra*) A common and valuable oak.

PIN OAK (*Quercus palustris*) An infrequent tree of swamp borders, found in southern and eastern counties.

SCARLET OAK (*Quercus coccinea*) Common on dry hills throughout the State.

BLACK OAK (*Quercus velutina*) One of the common oaks.

SCRUB OAK (*Quercus nana*) Common along both sides of the Alleghany mountains.

SPANISH OAK (*Quercus digitata*) Rare. Found along the Great Kanawha river near Charleston. Reported in a few other sections.

BLACK JACK OAK (*Quercus Marilandica*) On west face of Blue Ridge Mountains, Jefferson county. Reported from other parts of the State, farther west.

LAUREL OAK (*Quercus imbricaria*) A tree not often seen but sparsely scattered throughout the State.

WHITE OAK (*Quercus alba*) The commonest of the oaks.

POST OAK (*Quercus minor*) Found growing with white oak in some places, but not plentiful anywhere.

BURR OAK (*Quercus macrocarpa*) Found in a few localities east of the mountains.

SWAMP WHITE OAK (*Quercus platanioides*) Not often seen, but growing in several counties.

CHESTNUT OAK (*Quercus Prinus*) One of the common oaks.

YELLOW OAK (*Quercus acuminata*) A few trees found at widely scattered stations.

WHITE ELM (*Ulmus Americana*) A common tree of stream banks.

SLIPPERY ELM (*Ulmus fulva*) Not often found, but growing in many parts of the State.

HACKBERRY (*Celtis occidentalis*) Thinly scattered in most parts of the State.

RED MULBERRY (*Morus rubra*) The common mulberry.

CUCUMBER TREE (*Magnolia acuminata*) Scattered among other hardwoods.

UMBRELLA TREE (*Magnolia tripetala*) Along streams in many sections.

MOUNTAIN MAGNOLIA (*Magnolia Fraseri*) Sometimes found in high mountain woods.

YELLOW POPLAR (*Liriodendron tulipifera*) An abundant timber tree.

PAWPAW (*Asimina triloba*) Often found on low ground throughout the State.

SASSAFRAS (*Sassafras sassafras*) Abundant on low ground.

SWEET GUM (*Liquidambar styraciflua*) Found along the Great Kanawha, and in a few other places.

WITCH HAZEL (*Hamamelis Virginiana*) Common in most places.

SYCAMORE (*Platanus occidentalis*) A frequent tree along streams.

CRAB APPLE (*Malus coronaria*) Common.

MOUNTAIN ASH (*Sorbus Americana*) Found in high parts only.

SERVICE (*Amelanchier Canadensis*) A common tree.

JUNE BERRY (*) (*Amelanchier Botryopium*) Preston county.

COCKSPUR THORN (*Crataegus Crus-Galli*) A common thorn tree.

HAWTHORN (*Crataegus punctata*) Found often on mountains.

HAWTHORN (*Crataegus cordata*) Rare. Found at St. Albans.

HAWTHORN (*Crataegus Roanensis*) Hampshire county.

HAWTHORN (*Crataegus macrosperma*) Monongalia county.

HAWTHORN (*Crataegus pausiacae*) Upshur county.

HAWTHORN (*Crataegus feoida*) Grant county.

HAWTHORN (*Crataegus Holmesiana*) Monongalia county.

The following Hawthorns are also listed in Millspaugh's "Living and Fossil Flora": (Some of these are shrubby).

(*Crataegus armata*) Summers county.

(*Crataegus Oryacantha*) Fayette county.

(*Crataegus staminea*) Greenbrier and Summers counties.

(*Crataegus pruinosa*) Greenbrier and Summers counties.

(*Crataegus succulenta*) Greenbrier and Summers counties.

(*Crataegus spathulata*) Mercer and McDowell counties.

(*Crataegus Cryacantha*) Fayette county.

(*Crataegus mollis*) Mercer county.

(*Crataegus coccinea*) Several counties.

(*Crataegus molis*) Mercer county.

(*Crataegus tomentosa*) Grant county.

(*Crataegus flava*) Fayette and other counties.

(*Crataegus uniflora*) Mercer and Summers counties.

(*Crataegus rotundifolia*) Greenbrier county.

WILD PLUM (*Prunus Americana*) Common in most parts of the State.

WILD RED CHERRY (*Prunus Pennsylvanica*) Abundant at high elevations.

WILD BLACK CHERRY (*Prunus serotina*) The common wild cherry.

REDBUD (*Cercis Canadensis*) Growing in thickets in many sections.

HONEY LOCUST (*Gleditsia triacanthos*) Growing along streams.

YELLOW LOCUST (*Robinia pseudacacia*) The common locust.

KENTUCKY COFFEE TREE (*Gymnocladus dioica*) Rare.

STAGHORN SUMACH (*Rhus hirta*) A common sumach.

HOLLY (*Ilex opaca*) The evergreen holly.

MOUNTAIN MAPLE (*Acer spicatum*) Not common, but sometimes found on high ground.

STRIPED MAPLE (*Acer Pennsylvanicum*) A small maple of the mountains.

SUGAR MAPLE (*Acer saccharum*) The familiar maple of woods and fields.

BLACK MAPLE (*Acer nigrum*) Less common than the last.

SILVER MAPLE (*Acer saccharinum*) Abundant along some of our streams.

RED MAPLE (*Acer rubrum*) Common west of the mountains.

BOX ELDER (*Acer Negundo*) Found along streams in some sections.

OHIO BUCKEYE (*Aesculus glabra*) Found along the Ohio river.

SWEET BUCKEYE (*Aesculus octandra*) Common along streams.

BUCKEYE (*) (*Aesculus Pavia*) McDowell county.

LINDEN (*Tilia Americana*) A common timber tree.

LINDEN (*Tilia heterophylla*) Common.

LINDEN (*) (*Tilia Michauxii*) Upshur and Randolph counties.

HERCULES CLUB (*Aralia spinosa*) A small spiny tree found in thickets.

BLACK GUM (*Nyssa sylvatica*) A common tree throughout the State.

FLOWERING DOGWOOD (*Cornus florida*) The familiar dogwood.

ALTERNATE-LEAVED DOGWOOD (*Cornus alternifolia*) Common on low ground.

SOURWOOD (*Oxydendrum arboreum*) Common in most sections.

PERSIMMON (*Diospyros Virginiana*) Common east.

SILVER BELL TREE (*Mohrodendron Carolinum*) Rare. Growing along New River.

BLACK ASH (*Fraxinus nigra*) Not common.

WHITE ASH (*Fraxinus Americana*) The common ash.

RED ASH (*) (*Fraxinus Pennsylvanica*) In several counties.

GREEN ASH (*Fraxinus lanceolata*) Often seen.

FRINGE TREE (*Chionanthus Virginica*) Not common.

NANNYBERRY (*Viburnum lentago*) Tucker, Grant, and Randolph counties.

BLACK HAW (*Viburnum prunifolium*) The common haw.

Trees not native to this State, but escaped from cultivation, are not included in the above list; neither are the shrubs included.



West Virginia's Fish and Game.

By J. A. Viquesney, Forest, Game and Fish Warden.

From the settling of Jamestown in the year 1607 until the present time, the wild game of the forests, and the fish in the streams, have played a wonderful part in providing food for the pioneer settlers, who transformed the Virginias from a vast wilderness into an agricultural paradise and bee-hive of industry.

In the very nature of events, the creatures of the wilds must give way before the advance of civilization and the ever onward march of mankind. The time must come when in any given territory as the country becomes more populated with man, it must become less populated with the wild denizens of the forests. Civilized man and wild birds and beasts of prey cannot exist together, and it is the birds and beasts that perish.

The great forests of West Virginia, the once happy hunting ground of the American Indian, wherein abounded an abundance of bison, elk, deer, bear and all manner of wild animals and birds, was for at least two centuries furnishing food to the Indian and white man alike, before the States that now boast of their big game had been discovered, and yet West Virginia stands in the fore-front of all the States with the exception of a few species that have become decimated or extinct.

West Virginia is not supplied with so much large game as some of the other States at the present time, but yet has a great many white tail or Virginia deer, black bear, and an abundance of wild turkey, ruffed grouse and all kinds of small game.

The bison or buffalo once roamed in large herds over the West Virginia forests, being most numerous along the Ohio and Great Kanawha rivers. The last of these animals seen was a cow and calf in Webster county in the year 1825.

The Elk or Eastern Wapiti, had not been seen in this State since the year 1845 until three years ago when sixty-five head of these animals were brought to Pocahontas county by the Allegheny Sportsmen's Association, and the present rate of increase indicates that ultimately elk will again be plentiful in this State. A close season, with a felony offense is maintained on these animals.

The following letter from Dr. T. S. Palmer of the United States Biological Survey is the best evidence of the success of this adventure:

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF BIOLOGICAL SURVEY,
WASHINGTON, D. C.

October 12, 1914.

Mr. J. A. Viquesney,
Forest, Game and Fish Warden,
Belington, W. Va.

Dear Sir:—

In response to your request I take pleasure in submitting the following brief statement regarding the elk which I had the pleasure of inspecting last autumn.

Among the experiments in reintroducing elk in the eastern States one of the most promising is that undertaken in West Virginia by the Allegheny Sportsmen's Association. This Association has an extensive preserve near Minnehaha Springs in Pocahontas county, comprising about 25,000 acres and including both woodland and grazing lands, and an enclosure of about 100 acres surrounded with an 8-foot woven wire fence. Both deer and elk have been placed in the enclosure. In March, 1912, 15 elk were purchased in Iowa and early in 1913, through the co-operation of the State Forestry, Game and Fish Warden, 50 elk were obtained from the Yellowstone

National Park, Wyoming. The animals from the Park were shipped east with a similar consignment for Pennsylvania, in charge of Mr. Howard Eaton, and were delivered at Minnehaha Springs without loss en route. Subsequently, some of them escaped from the enclosure and were not recaptured.

In November, 1913, when I had the pleasure of examining the elk in the enclosure, the herd comprised 32 head—5 bulls and 27 cows. Of the 65 elk originally obtained, 4 had been lost by various accidents, and one, an unruly bull, had been killed; about half were under fence, and 28 were running at large. The elk in the enclosure were in excellent condition, quite tame, and seemed very much at home.

The preserve on which the elk have been established includes some of the highest mountain ridges and extends to the eastern boundary of the State adjoining some of the lands which will ultimately be included in the Appalachian National Park. The location is ideal and there is every reason to expect that the elk within and without the enclosure will increase rapidly in numbers. Great credit is due to the State Warden and the Association for their foresight and public spirit in thus inaugurating the movement to restock this part of the Alleghenies with one of the noblest big game animals formerly native to the State.

Very truly yours,

T. S. PALMER,
In Charge of Game Preservation.

The State's Fishing Streams.

West Virginia has been rightly named the birth place of rivers, and being so abundantly supplied with so many beautiful streams of crystal water, taking their rise in the high mountain peaks and wending their way through miles of unbroken forests to larger streams, that ultimately reach the Atlantic Ocean and the Gulf of Mexico, affords scenery that in picturesque beauty is not surpassed in America, and offers the most delightful fishing to be found in the world.

With a diversity of altitude, ranging from 250 feet at Harper's Ferry to 5000 feet on the high mountain tops, the climate and natural conditions are especially attractive to sportsmen, fishermen and recreation seekers.

More than one hundred species of fish abound in West Virginia waters, among which are some of the most valuable food and finest game fish in the United States; it being contended by Hon. George M. Bowers, United States Fish Commissioner for sixteen years, that trout grew larger here in a given length of time than anywhere else in the United States.

The most important of the game fishes are the two species of black bass, viz: the small mouth and large mouth black bass. The principal food fishes are the wall-eyed pike, muscalonge, rock bass, different varieties of perch, cat and suckers. The brook or mountain trout, which is native to West Virginia waters, is possibly the most interesting of all the species, and a week's vacation along some mountain stream where the foot-steps of man has seldom trod, where the whip-poor-will at night and the very by day, furnish the sweetest of music, makes one forget the sordid cares of a busy world and restores the bloom and vigor of youth.

The wild and primitive conditions of these forests and streams continued in West Virginia, with a seeming inexhaustible supply of game and fish, until with spreading towns and cities, populous farms, the bungalow against the mountain side, fleets of motor boats, honking automo-

biles, lumber camps and various pursuits of commercialism, bringing in thousands of men and boys from other States and other lands, armed with seines, traps and dynamite to destroy our fish, and with the utterly merciless repeating and automatic shot gun to destroy our game, with each individual, whether white or black, bond or free, naturalized or unnaturalized, demanding his constitutional right to fish and hunt when, where and how he pleased, the decimation of our fish and game became imminent and some restrictive laws for their protection imperative.

Leading in Bird Protection.

Leading all other States, West Virginia, in the year 1867, enacted a law giving protection to all insectivorous and seed eating birds, but not until the year 1909 was any organization perfected whereby these laws might be specially enforced and the people educated to a better understanding of the usefulness of these birds.

The statute enacted in the year 1909, and at subsequent sessions of the Legislature, makes it a felony to dynamite fish, a felony to kill an elk or chase deer with dogs, prohibits the sale and shipment of all kinds of game, makes short open seasons with reasonable bag limits, prohibits the unnaturalized foreigner from hunting any of the wild animals or birds, or from carrying a gun for such purposes, and provides a warden system through which the law may be enforced. With a better law, a more favorable sentiment for its enforcement, and with the passing of the many destructive agencies that threatened the annihilation of some of our most valuable species of fish and game, West Virginia again promises

to be the paradise of the sportsman, fisherman and recreation seeker.

Only when our game and fish were almost gone did the people of West Virginia awaken to the fact that the game and fish are among the great resources of a State; not until the birds had been destroyed by the thoughtless boy, the miserly pot and market hunter and the criminal for-eigner, did we realize the tremendous loss sustained.

West Virginia has two hundred and sixty-one species of birds, and the people have learned at last that it is difficult indeed to place a money valuation on them, for upon them depends man's continued existence upon this earth; without them vegetation would soon be destroyed, without vegetation the water supply would soon dry up, and in fact in a short time all vegetable and animal life would perish from the earth.

Standing in the forefront of States in the production of coal, coke, oil, gas and timber, with orchard land sufficient to raise fruit enough to feed the people of the United States; with an area of blue grass in excess of the famed blue grass State of Kentucky, with water power sufficient to generate electricity to run every trolley car and manufacturing plant in the nation, with hunting and fishing not excelled in any State in the Union, we can extend a generous invitation to good people everywhere to locate among us, and a week's vacation in the beautiful mountains, along our clear, crystal streams in quest of the speckled trout, amid the solitude of our forests, where we can forget the routine cares and worries of life, surrounded by the singing birds, the drumming pheasant, the quacking squirrel or the whistling bob-white, breathing the pure atmosphere, uncontaminated by the busy rush of the bustling world in its sordid hunt for the almighty dollar, is worth a whole eternity of ordinary existence.

Water Power Potentialities of West Virginia.

Among the vast and varied resources of West Virginia it is doubtful if there is any that promise more for the future development of the State than the water power potentialities of its many streams. The economies of modern business life call for the conservation of those resources that are exhaustible, and for the substitution in their place of such as are renewable either from natural causes or by the application of scientific methods of use and culture. Just now West Virginia has such a wealth of fuel products, which may be utilized in the production of power—coal, oil and gas in immeasurable quantities—that it would seem that this State of all those in the Union might well be prodigal in their expenditure, nor make calculation against the time when they shall become exhausted; but the mind that projects itself into the future and grasps the significance of the bearing that fuel exhaustion must have upon the well-being of the generations to come, cannot but feel the responsibility that rests upon those of the present day to conserve so far as they can these resources that have been provided for the people of all times.

Coal and oil and gas utilized as fuel readily provide power for the uses of man; but a ton of coal or a barrel of oil or a thousand cubic feet of gas once consumed is forever gone—its destruction is complete so far as any known use is concerned. With water power it is different. The streams in their course, rushing down from moun-

tain height to valley and running onward to the sea in never ending flood, furnish a continual, never-ceasing opportunity to the genius of man to install plants that will develop an inexhaustible, unending supply of power.

The annual cost of developing one continual horse power by means of the generation of steam runs from \$25 to \$150, depending upon the type of engine and boiler and the capacity of the plant. These figures are based upon coal at \$2 a ton, and include interest at 5 per cent., depreciation, repairs, oil and waste. The cost of building a plant and installing machinery for the making and delivery of hydro-electric power is from \$45 to \$200 per horse power. The cost of delivery depends upon the distance of the point of using from the point of development, as it can be delivered more cheaply at less distance. In Canada there is a government commission which has authority to control plants and sell power. It purchases electric current from the Ontario Power Company, a private corporation with a plant at Niagara Falls, for \$9 per horse power per annum, and sells it at from \$18 to \$29.50, according to distance from Niagara Falls. The City of Toronto, 90 miles away, buys 10,000 horse power from the commission at \$18.50 per horse power per annum for a 24-hour service, which is much less than it could be produced for by a steam plant.

The same thing can be done in West Virginia, with some variations caused by location. Little hydro-electric power is being developed in the State as yet, but the opportu-

ities for such development are large, and they must, in the course of time, be utilized.

Rivers that Furnish Opportunities.

Government estimates place the total minimum power of the streams in West Virginia at 350,000 horse power, the maximum at 1,163,000. Of this amount the New-Kanawha river is estimated to have 196,000 minimum and 464,300 maximum, to which is added on account of storage possibilities, 55,640 for the full year, 111,280 for six months, and 222,560 for three months. These estimates are for the main river, and do not include the tributaries.

For the Greenbrier river the estimates for 10,671 minimum, 37,160 maximum, and from storage 70,160 for twelve months, 140,300 for six and 280,000 for three. The tributaries of the Greenbrier are estimated at 3,082 minimum and 7,472 maximum.

The Gauley is estimated at 14,200 minimum, and 90,520 maximum, with storage possibilities for 14,120 for twelve months, 28,240 for six and 56,480 for three. The amounts to be added for its tributaries are 3,389 minimum and 34,418 maximum.

The estimates for the Elk river are 6,502 minimum and 38,680 maximum with storage possibilities for 19,000 for twelve months, 38,000 for six, and 76,000 for three. The amounts to be added for its tributaries are 3,327 minimum and 15,445 maximum.

The estimates for Coal river are 1,408 minimum and 13,100 maximum.

The estimates of the minor tributaries of the New-Kanawha river are 7,258 minimum and 23,247 maximum.

The estimates for the Tygarts Valley-Monongahela river are 6,916 minimum and 42,970 maximum, with storage

possibilities for 12,890 for twelve months, 25,780 for six months and 394,800 for three months. The amounts to be added for the minor tributaries of the Tygarts Valley-Monongahela are 2,408 minimum and 15,155 maximum.

The estimates for the Cheat river are 19,986 minimum and 65,130 maximum, with storage possibilities for 48,300 for twelve months, 96,600 for six and 193,200 for three. The amounts to be added for its tributaries are 8,861 minimum and 22,080 maximum.

The estimates for the Little Kanawha are 1,711 minimum and 12,790 maximum. The amounts to be added for its tributaries are 2,938 minimum and 13,933 maximum.

The estimates for the Big Sandy river are 4,730 minimum and 24,021 maximum.

The estimates for the minor tributaries of the Ohio in West Virginia are 3,399 minimum and 53,475 maximum.

The estimates for the North Branch of the Potomac river are 18,768 minimum and 85,330 maximum, with storage possibilities for 16,600 for twelve months, 33,200 for six and 51,560 for three. The amounts to be added for its tributaries are 17,210 minimum and 46,188 maximum.

The estimates for the South Branch of the Potomac river are 8,904 minimum and 31,000 maximum, with storage possibilities for 16,000 for twelve months, 33,200 for six and 66,400 for three. The amounts to be added for its tributaries are 7,713 minimum and 26,720 maximum.

The development of hydro-electric power in West Virginia up to the present time is almost negligible, but development of a larger character is now under way, and others are in contemplation. It can be a matter of but a short time until the immense amount of power now running to waste shall be conserved and utilized for the purpose of man.

The State's Transportation Facilities--The Railroads.

Until comparatively recently West Virginia was sadly hampered by lack of transportation facilities. For many years the Baltimore & Ohio and the Chesapeake & Ohio were the only railroads of importance in the State, and the only ones, great or small, that furnished means of transporting West Virginia's products to outside markets. But with the increasing demand for coal and timber that has come during the last few years other trunk lines have been built into and through the State, and lateral lines have been laid to many points not on main lines, until practically every section is adequately supplied with all necessary facilities for reaching the world's markets.

The Baltimore & Ohio railroad, oldest of the country's important railway systems, was built into what is now West Virginia territory in 1834 at Harpers Ferry, at the eastern extremity, and by January 1, 1853, had been extended and opened up for traffic to Wheeling, on the Ohio river. By May 1, 1857, the branch line which runs from Grafton had been built to the Ohio river at Parkersburg. Since that time this great road, by building and purchase, has acquired lines running from Kenova, at the State's extreme southwestern corner, up the Ohio river through Huntington, Point Pleasant, Ravenswood, Parkersburg, St. Marys, Sistersville, New Martinsville and Moundsville to Wheeling, and thence to Pittsburg; from Richmond, in the south-central part of the State, through Weston, Clarksburg, Fairmont and Morgantown to Pittsburg; from Mill-

wood and Ravenswood to Ripley and Spencer; from Grafton to Belington; from Weston to Pickens; from Green Springs through Romney and Moorefield to Petersburg, and numerous other lines of greater or less length designed to serve particular communities.

To the east the Baltimore & Ohio gives those portions of West Virginia which it serves direct connection with Washington, Baltimore, Philadelphia and New York, and by means of its connections, with practically every center of population and commerce on the eastern seaboard. Westward it carries direct to Cincinnati, St. Louis and Chicago, and by way of connected lines to all the cities in the West and Middle West. It delivers traffic to ocean carriers at Washington, Baltimore, Philadelphia and New York; to river-borne boats at every town on the Ohio river from Wheeling to Kenova, and easily reaches the vessels plying the Great Lakes by way of its allied lines. In short, there is no market of the busy world but can be reached with ease by any product originating in those parts of West Virginia served by the Baltimore & Ohio railroad.

The Chesapeake & Ohio railroad completed its line through West Virginia on January 19, 1873, when the two construction forces, one building from the east, the other from the west, met and joined their work together at the eastern end of the bridge over New River at Hawks Nest. This road has built branch lines in West Virginia running from Ronceverte up the Greenbrier river into the wooded

hills and rich bottom and table lands of Pocahontas county; up Piney river and Upper Loup into the wealth of coal abounding in Raleigh and Fayette south of the main line; from St. Albans up the valley of Coal river, and from Harboursville up the valley of the Guyandotte through Lincoln into the great coal field of Logan county. It has constructed short lines into various other fields, until it has come to serve a very large territory in the south-central portion of the State.

The Chesapeake & Ohio puts its West Virginia territory in touch with Washington, Baltimore, Philadelphia, New York and the other trade centers of the Northeast; with Richmond and Norfolk and Southeastern points, while to the westward it reaches Cincinnati, and Louisville over its own line, and over its connections Indianapolis, St. Louis, Chicago and all the centers of business of the Middle West and West. At Newport News, on Hampton Roads, its patrons have the advantage of harbor and seaport facilities not surpassed anywhere in the country, and its western connections carry direct to the principal ports on the Great Lakes. It borders on the Ohio river from Huntington to Cincinnati. The Chesapeake & Ohio is one of the great passenger thoroughfares of the country, and its superb through trains are patronized by many thousands traveling between the East and the West.

The Norfolk & Western was the third great trunk line to lay its tracks across the State of West Virginia from east to west. This was accomplished in 1892, the gap between the eastern and western portions of the road being closed about eight miles east of Williamson on November 12 of that year. The Norfolk & Western road enters the State from the east in Mercer county, and proceeding westward crosses the counties of Mercer, McDowell, Mingo and Wayne and passes over the Ohio river at Kenova. From the main line this road has thrown out numerous branches to serve the immense coal developments in the territory through which it passes. Though it is the youngest of the State's big trunk lines, it is the largest carrier of West Virginia coal.

The eastern terminus of the Norfolk & Western is Norfolk, where it delivers to shipside the coal, lumber and other products gathered from West Virginia's mines, forests and fields, to be thence transported to the markets of the world. One of its lines reaches Richmond and another extends as far north as Hagerstown, Md., crossing the Eastern Panhandle of West Virginia, and still other extends to the southward, into Southwest Virginia and the fertile fields of North Carolina. By way of its connections it puts West Virginia points in close touch with the centers of business both east and west, and gives easy access to the principal lake ports.

The Virginian Railway, running from Deepwater, on the Great Kanawha, to Norfolk, on Hampton Roads, opens up a fine coal producing territory not tapped by any other railroad. It was constructed with a special view to carry tonnage from West Virginia to the seaboard, its low grades and compensated curves permitting the hauling of loads not possible to roads of old-time construction. It enters West Virginia from the east by way of Mercer county, running from that county into Wyoming, Raleigh and Fayette, and has been the means of developing a vast coal production in those counties.

Eastward it carries direct to Norfolk, connecting there with vessels sailing every sea and making every known port. By way of its rail connections it reaches Washington, Baltimore, Philadelphia, New York and the great centers of population and business of the Northeast, and

Richmond and the other cities of the Southeast. Connecting at Deepwater with the Chesapeake & Ohio, it has traffic arrangements with that road that enable it to put passengers and freight into all sections of the West.

The Western Maryland railroad enters the State at Piedmont, and running through Mineral county, skirts the edge of Grant and passes through Tucker and Randolph into Pocahontas and Webster. It penetrates regions underlaid with fine deposits of excellent coal, and covered in some instances by virgin forests. Some of these counties embrace also some of the finest grazing and general agricultural lands of the State.

The eastern terminus of the Western Maryland is Baltimore, and there it delivers such of its freight as is intended for foreign markets to the ships that ply the waters of Chesapeake bay and the Atlantic ocean. Through its connections this road leads direct to the country's principal centers of traffic, giving the territory through which it passes excellent facilities for reaching all.

The New York Central system has one line that enters the State where Monongalia county impinges on Pennsylvania, and, following the course of the Monongahela river, runs through Morgantown and as far south as Fairmont. Another branch of the same system crosses into West Virginia at Wheeling.

The Pennsylvania system sends a line into West Virginia from Pittsburgh as far south as Wheeling, serving the counties of Hancock, Brooke and Ohio.

The Kanawha & Michigan railroad enters the State at Point Pleasant and runs southeast through Mason, Putnam and Kanawha counties, and as far as the mouth of the Gauley river in Fayette county, a distance of 92 miles. It passes through the coal regions of Kanawha county, and serves the mines lying on the north side of the Great Kanawha river. This road has direct lines to Columbus, Cleveland and Toledo, delivering West Virginia coals in large amounts to the ships on Lake Erie at the latter two points. Its various connections reach all the principal cities of the Middle West and carry West Virginia products into all.

The Coal & Coke railway is an important line lying wholly within the State, and extending from Charleston to Elkins, a distance of 175 miles. In its course it passes from Kanawha county through Clay, Braxton, a corner of Gilmer, a portion of Lewis, Upshur and into Randolph. The territory penetrated by it contains immense coal beds and has large bodies of timber that give employment to numerous mills.

The West Virginia Midland is a narrow gauge railroad running from a connection with the Baltimore & Ohio at the mouth of Holly river, in Braxton county, to Webster Springs, in Webster county. It serves a section from which there is still a large amount of timber to be moved, and which will also, in time, become an important factor in the coal production of the State.

The Kanawha & West Virginia railroad runs from Charleston, in Kanawha county, some fifty miles to the northeast, penetrating a coal and timber territory not otherwise served by a railroad. At Charleston it connects with the Chesapeake & Ohio and the Kanawha & Michigan, and over their lines sends coal and lumber into many markets.

The Little Kanawha railroad extends from Parkersburg, on the Ohio river, southeastward into Wirt county, furnishing outlet for the products of the rich valley of the Little Kanawha river.

The Morgantown & Kingwood railroad runs from

Morgantown, in Monongalia county, to Rowlesburg, in Preston, connecting with the New York Central at Morgantown and with the Baltimore & Ohio at both ends. It is an important carrier of coal, lumber and other products of Monongalia and Preston counties to the markets of the world.

The Clarksburg & Northern Railroad extends from Clarksburg, in Harrison county, through Marion and to New Martinsville, in Wetzel county, on the Ohio river. It carries large quantities of coal from the mines of Harrison and Marion for delivery to Ohio river points.

These roads are supplemented by numerous coal roads, lumber roads and other short line feeders, the whole forming a network of transportation lines that serve practically every important community in the State. As new coal, lumber and agricultural developments are made new lines of railroad are built, and soon every part of the State will be ramified by these highways of commerce.

The State's Interurban Lines.

In addition to the steam railroad lines West Virginia has a number of electric interurban lines that are of more than mere local significance and importance, all effective in the bearing they have upon the State's general scheme of transportation.

Chief among these, perhaps, by reason of mileage, are the lines radiating from Wheeling, reaching to Moundsville on the south, to Steubenville, Ohio, on the north, and to numerous nearby town and country points east and west. These roads render easy the communication between the various cities and towns served by them, and have been largely instrumental in the development of suburban sections which they traverse.

From Fairmont an interurban line reaches southward to Clarksburg and Weston, the latter more than fifty miles distant, and northward to Mannington, taking in many intermediate towns and carrying an immense traffic, both freight and passenger.

From Sistersville there is a line to Middlebourne, county seat of Tyler county, while another extends from Sistersville to New Martinsville, in Wetzel county. Both these lines run through excellent farming and trucking lands.

Parkersburg has an electric road up the Ohio river to Williamstown and Marietta that has been the cause of a large suburban development along the broad and beautiful Ohio river bottoms which it traverses.

Huntington has an electric line that extends from the mouth of the Guyandotte through Huntington proper, Ceredo and Kenova, West Virginia, Catlettsburg and Ashland, Kentucky, and as far west as Ironton, Ohio. This line has been a tremendous factor in the development of the towns and country sections through which it passes.

The Charleston Interurban Railway Company has a line extending from Charleston to St. Albans, a distance of twelve miles west, and is just beginning an extension to Montgomery, in Fayette county, 24 miles toward the east. There has been a very rapid development of the territory through which the road now passes, and an even more rapid development is expected in that soon to be penetrated.

Another line running out from Charleston is that of the Charleston-Dunbar Company, from Charleston to the new industrial town of Dunbar, a distance of six miles. The

road has been in operation less than two years, and yet scores of houses have been built along its line, giving assurance that within a few years the entire six miles will be practically one town.

Other cities and towns of the State have electric lines upon their streets, some of which reach into suburban sections, and all have had their effect in the development of the territory served by them.

The State's Navigable Rivers.

Before the day of railroads the territory now known as West Virginia was considered peculiarly blessed because of the possession of a number of navigable rivers which furnish facilities of transportation denied to many other States. The Ohio, forming the western boundary of the State from its northernmost point for almost three hundred miles, served as a natural highway for traffic, and upon its bosom the products of the fields, furnaces, factories and mines along its banks were sent to the markets of the West and South. It is true that for some portions of almost every year the Ohio was navigable for boats only of very light draft, and in some unusually dry seasons even these could not run; but with the growth of commerce came the improvement of the river by the general government, until it was rendered serviceable for practically all of every year. Latterly, because of the immense amount of traffic being developed upon its shores, the task of rendering the Ohio navigable for boats of heavy draft throughout the entire year has been undertaken, and by a system of locks and dams it is to be given a continuous nine-foot stage from Pittsburgh to Cairo. This will largely increase its usefulness as a conveyor of traffic, and West Virginia will be one of the chief beneficiaries of the improvement.

The Great Kanawha, navigable for boats of lighter draft, during most of the year, formerly carried practically all the traffic to and from the valley through which it runs, and also for many localities not situated directly upon its banks. More than forty years ago the general government began to permanently improve it by putting in locks and dams from its mouth to Kanawha Falls, a distance of some ninety miles, and the work was long ago completed to Montgomery, about eighty miles. Millions of bushels of coal have been carried out of the Kanawha each year on the way to down-river markets, and many millions will be carried during each of the years to come until that almost inconceivable day when the deposits within its reach have become exhausted.

By locking and damming the government has rendered the Monongahela river navigable for boats of considerable size throughout its entire length, from Pittsburgh to Fairmont. Thus is competitive transportation furnished for the coal and other products of Marion and Monongalia counties.

The Little Kanawha and the Big Sandy have both been improved by systems of locks and dams, and each serves a considerable scope of West Virginia territory with excellent facilities of transportation.

With more than four thousand miles of steam railroad, almost six hundred miles of navigable rivers, and two or three hundred miles of electric interurban roads, West Virginia is well equipped from the standpoint of transportation to meet the great opportunities which beckon it on to a splendid future.

Educational Development in West Virginia.

By M. P. Shawkey, State Superintendent of Schools.

The public school system of West Virginia is a little less than fifty years old. It began with the election of Dr. White as State Superintendent in 1864, in accordance with the educational provisions of the first constitution of the State. To be sure, Ohio, Kanawha and Jefferson counties made a beginning before that date, acting under authority of the first general school law of the Old Dominion. This law was enacted in 1846 and gave to any county the authority to establish a system of free schools within certain prescribed limitations. To Jefferson county belongs the honor of being first to establish such schools in the present State of West Virginia. This was done in 1847. Ohio and Kanawha counties followed Jefferson's lead by launching a single school each in 1848. Thus we have before us the simple beginnings of the present state-wide school system of West Virginia. Compared with what we have today they were, indeed, as the grain of mustard seed compared to the full grown tree.

While the free school idea met with much favor among most of the people west of the mountains, the growth of schools was slow, owing to a number of things, but more especially to the sparseness of the population and the strained circumstances of the people. All this was preliminary to the real development of our present school system. It represents a period of uncertainty, a groping in the dark, a searching after light.

When Dr. White was chosen State Superintendent and placed upon the duties of that office immediately ideas began to crystallize, the features of a system began to come forth out of the cloudy doubt and uncertainty.

The report of Dr. White's first year's work sets out with some definiteness the number and kind of schools in the State at the beginning. By that report we find that of the fifty counties then composing the State twenty-two had established a system of free schools, while eleven others had taken some steps toward the establishment of such a system. There were 133 schools with 431 rooms and an enrollment of 17,972 pupils. The enumeration showed 63,458 children of school age. It was a great good fortune to this State that the direction of her education interests was at the very first committed to so wise a leader as Dr. William Ryland White.

Laying the Foundations.

Dr. White had been a student of Horace Mann, America's greatest educational statesman, and a co-laborer with him. While admitting some discouragement on account of the hard conditions of the early life of the settlers and because of the lack of interest on the part of a large proportion of the people, he nevertheless faced the future hopefully and planned even more wisely than he himself knew. Acting on Dr. White's recommendation, the Legislature established the West Virginia University at Morgantown in 1867. Between this great university and the humble elementary schools first established a great gap existed. How that gap has been closed will appear later. It was all in the first far-seeing plan of the first State Superintendent. Dr. White also saw that the first need of these new schools as of all schools was trained teachers. He accordingly recommended the establishment of a series of teacher training schools. The Legislature was quick

to respond to this suggestion also. In 1867, under its provisions, the State acquired the property of Marshall College at Huntington and converted that institution into a State Normal School for the training of teachers. Later five other (branch) normal schools were established, viz: one at Fairmont in 1868; one at West Liberty in 1870; one at Glenville in 1872; one at Shepherdstown in 1872; one at Athens in 1872.

To call these institutions normal schools was more a declaration of faith than a statement of facts, for they were not professional schools in any sense of the word, yet it would be difficult to overestimate their value in the educational development of the State. They were at first little more than good, strong elementary schools for more mature pupils. Later they took the lead in secondary work; and finally, during the present day, they assumed the character of real normal schools. We get a better conception of the important part they have played in the State's educational development when we recall that they have enrolled and instructed, during these years of growth, something like sixty thousand of the best young men and women of the State. That conception is further quickened when we glance at the roster of men who have served as principals of these schools and note the character of the men and their prominence in the educational affairs of the State. Such men as Dr. William Ryland White, Dr. J. G. Blair, Professor U. S. Fleming, Dr. R. A. Armstrong, Dr. J. N. Deahl, Professor S. B. Brown and Honorable Thos. C. Miller tell the story of the normal school mission in such terms that any comment I might add would simply be trifling with words.

It will be found upon investigation that these normal schools for which Dr. White made such a vigorous fight, declared that "it would be better to suspend the schools of the State for two years and donate the entire school revenue for that time to the establishment and endowment of a State Normal School than to have none at all," with their ups and downs, with their meager equipment and still more meager support, oftentimes fighting for their very existence, have nevertheless reached a larger number of people in the State than any other State school and have done more for the elementary and secondary education of the State than any other institution. They have touched a larger number of teachers in the elementary schools and have been in closer touch with the masses, leading, encouraging and instructing them, than any other of our State institutions. This was their province, and while the work they did through all these years of struggle was very imperfect, the present harvest of results give additional evidence of the importance of the service which they rendered.

Other Agencies.

While recognizing the large amount and the importance of the work the University and the normal schools have done in the development of education in the State, we must not overlook the service rendered by the numerous other educational agencies that have been at work from time to time, serving in one capacity or another, with ideas very much at variance at times but all working toward the final important end. Among the important agencies in the early years especially, the old-time acad-

emies must not be overlooked. Of these Virgil A. Lewis, in his "Handbook of West Virginia," gives a list of sixty-five and calls it a "partial" list. All of these have now disappeared or have been converted into other institutions, but their vital influence may be seen in the educational sentiment and the more modern schools that have grown out of that sentiment in many localities of the State, such as Buckhannon, West Liberty, Clarksburg, Charles Town, French Creek and numerous other places. While these academies were of a local and rather temporary character, they gave rise in the latter part of the half century of our history to a number of larger and more permanent private and denominational institutions which are at the present time playing a significant part in the educational work of the State. No present-day view of educational matters in West Virginia would be complete that did not take in the West Virginia Wesleyan College at Buckhannon, Bethany College at Bethany, Salem College at Salem, Broadus Institute at Philippi, Powhatan College at Charles Town, Morris Harvey College at Barboursville, Beckley Institute at Beckley, Allegheny Collegiate Institute at Alderson, Alderson Academy at Alderson, Davis and Elkins College at Elkins, Lewisburg Seminary at Lewisburg, Greenbrier Presbyterian Military School at Lewisburg, Mount De Chantal Academy at Wheeling and Stephenson Seminary at Charles Town.

The Legislature of 1909 recognized the value of the services that some of these institutions were rendering to the State and provided that graduates of their normal departments should be given State certificates without examination the same as the graduates of our State normal schools. The reports from last year show that the private institutions of the State furnished 22 per cent. of the graduate teachers to whom certificates were granted without examination.

The other institutions that should be mentioned as contributing materially to the educational development of the State are the West Virginia Colored Institute at Institute, which was established in 1891 and is now equipped with a farm and a splendid group of buildings and enrolls nearly three hundred students annually, and the Bluefield Colored Institute at Bluefield, which was established in 1895 and is rendering much excellent service to the large colored population in the southern section of the State. This school enrolls more than two hundred pupils a year and is crowded to the limit of its capacity. Another institution belonging to this class is Storer College at Harper's Ferry; which was established by John Storer, of Maine, during the Civil War, but which for many years has been partially supported by State appropriations and has been closely identified with the general educational work of the State.

The schools for the deaf and blind at Romney were established in 1870 on a small scale, but gradually the State has provided more liberally for the education of these two classes and the value of the particular service which these institutions have rendered is very great.

Effectually re-enforcing the work of the public schools and the other educational institutions are the Girls' Industrial School at Salem and the Boys' Industrial School at Pruntytown near Grafton. These institutions have been peculiarly successful in the work which they have undertaken to do.

When we glance back over the record of the State we are likely to evince some enthusiasm over the continuous, substantial and rapid educational advancement. We must not overlook the fact, however that, there have been fail-

ures and disappointments along the way, that mistakes have been made here and there, that stubborn obstacles have obstructed the path of progress, and that every advance has meant a fight to overcome opposition of one sort or another.

The Vanishing Factor.

"Pioneering" in West Virginia has become a matter of history only. The pioneer settler, the pioneer statesman, the pioneer institution and the pioneer teacher have alike disappeared. A picture of that early life which held so much deprivation, hardship and suffering softens in the distance and shows up other characteristics that appeal to the heart more favorably. The faith, zeal, earnestness and patriotism of the early mountaineers were of as genuine quality as that found among the Spartans of old Greece or the patriots of the Swiss Alps.

The log-house school was crude, but the ideals of life which it upheld were noble in their simplicity, and the passing of that old institution stirs us with mingled feelings of gladness and sorrow. While we rejoice at the day of more modern architecture, the old log-house will ever have a place in memory dear. Its gradual disappearance during the past generation is an accurate index of the thorough revolution that has been going on in the educational work of West Virginia. The figures are striking. In 1890, for instance, there were 1,007 such school buildings in the State out of a total of 4,814 of all classes. In 1900, just ten years later, the total number of school houses had increased from 4,814 to 5,916, but the number of log houses had decreased from 1,007 to 345. In the next decade up to 1910 the total number of school buildings increased from 5,916 to 6,674, but the number of log houses had decreased to a mere handful, 75. Our reports for last year show that the use of the log-house has gone forever, there being but a scattered half dozen in temporary service as a kind of makeshift, pending the construction of newer buildings.

We have even gone beyond what was once considered a modern frame structure and the average community now demands that the public school shall be of such architectural design as to comply with the latest developments of science. It is built for both health and beauty and stands as an emblem of progress in the community.

Higher Standards for Teachers.

As the school system of the State developed, the demand for trained teachers became more insistent year by year. For a decade or two the public press and the teachers' institute resolutions kept calling for a reform in the method of issuing teachers' certificates. Accordingly, the Legislature of 1913 passed a sweeping uniform examination law, placing "the general regulation, direction and control of all matters relating to the examination of applicants for teachers' certificates" in the hands of the State Superintendent of Schools. This sudden change worked some hardship and probably had some temporary ill effects, but on the other hand it removed the certificate-granting authority from the sphere of local control, fixed a wider horizon for the teachers, made him, in fact, a state-wide institution. As a consequence of this open market a rivalry set in among the various districts for securing the best teachers, which was followed naturally by a distinct advance in teachers' salary. Moreover, the new law gave the State and county superintendents a better means for supervising the work of teaching and afforded the opportunity for a successful organization of reading circles and

district institutes. The important outcome of all of this is a marked and gratifying improvement in the personnel of the teaching body of the State which is showing itself in the general improvement of the schools.

A Better Day for Rural Schools.

With the revolution of the industrial life of West Virginia there came a crisis in the elementary school work. Abundant opportunities and the remunerative wages lured from the profession of teaching hundreds and hundreds of the older and even younger men and women who formerly found teaching the best business in the community, because it paid a fair cash salary and kept them in touch with the world of active thought. This sudden change was especially hard on the rural school. At the same time it was discovered that, while the towns and cities were developing hundreds of features for the enriching of life, there had been little change in rural life. Consequently those progressive teachers who were disposed to remain in the profession naturally drifted toward the towns and cities. This State in harmony with what was being done elsewhere turned its attention to the rural school problem. Among the first things to be done was to provide a supplementary school fund which would enable even the remotest rural sections to maintain a six months' term paying at least the minimum salaries which have been fixed by law. The first supplementary fund of this kind was appropriated by the Legislature of 1908 and amounted to \$50,000 for teachers' fund purposes. That amount later was increased to \$75,000, and \$15,000 additional was appropriated for building fund purposes at which figures it is still maintained. At the same time our teachers' institutes and normal schools began to give special attention to the peculiar problems of the rural school. This was followed in 1910 by the appointment of a State Rural School Supervisor, who has especially co-operated with the district supervisors, of whom there are now 58 in service. The last Legislature showed its interest in the rural problem by providing the State University with ample funds for agricultural extension work. The development of farm interests of the State will be a potent factor in strengthening and vitalizing the rural schools.

The High School Era.

During the first quarter of a century of our existence as a State, the University, which we have seen was established in the very infancy of our State's existence, found it extremely difficult to win large numbers of students for college work. Indeed, it found it necessary to maintain a preparatory department to train boys and girls for college, and this preparatory department became the larger part of the University. The University, together with the educational agencies, kept on preaching the crusade of higher education, and a decade ago our people began to be aroused to the need of high schools. The high school era may be considered to have begun, however, in 1909, when the State Superintendent organized the division of high schools in the State Department and appointed a State Supervisor of High Schools. The slogan adopted was "One Hundred High Schools for West Virginia within four years." The crusade was organized, literature published and sent broadcast, and wherever the people manifested an interest in the high school project, information and assistance were given in working out the problem. Meanwhile, legislation was shaped up, and in 1911 the Legislature passed a bill providing for State aid to high

schools, on a basis of a standard classification which was to be made by the State Superintendent. As a result of this movement and the various influences at work, we have today (1915) 142 standard high schools in West Virginia, with something like a score more in process of organization and construction. The value of high school work shows in both directions. It is first reflected in the improved opportunities for intellectual life in the various communities and in the greater interest shown in educational work in these communities, and second in large time are coming from the various high schools of the increase of enrollment in the freshman class of the University, practically all of whose recruits at the present State. For instance, the freshman class of 1912 of the University was 20 per cent. larger than any former freshman class, and not only is the class so much increased in size, but the general average of preparation shown by the students is much better.

Present-Day Conditions.

Hamlet, striving to convince his mother of the great worth of his father, appealed to her to "look on this picture, then on this." We first took a glimpse at the Mountain State in her infancy and poverty. We saw that she aimed in the right direction, and was impelled by lofty ideals, but was inexperienced, poverty-stricken, troubled with turmoil and strife, and shaken with doubt. We have seen that at the end of the first year's existence of her public school system we had 113 schools only, with 431 teachers, with an enrollment of 17,972 and a total school enumeration of 63,458 children of school age. Note what the half century has done for us in these matters. The 133 schools have grown to 7,102. The 431 teachers have been supplanted by 9,820. The 17,972 pupils are replaced by 229,135 and the children of school age now number 399,845 instead of the 63,458 at that time.

Some visitors to the recent land show at Chicago wrote me, "We are interested in the industrial opportunities of West Virginia, but before deciding whether or not to move to your State we would like to know what facilities you offer for the education of our children." To such inquiries I am pleased to report that West Virginia now provides a good elementary school within reasonable distance of every home in the State, maintained for a minimum term of six months, that we provided reasonably good teachers for all such schools at a fair rate of compensation and that we have provided abundant means of counsel and help for every community that desires to improve its educational facilities. In addition to the elementary schools there are a large number of graded schools and at this time we have 142 good high schools, being on an average a little more than two to a county. In addition to the high schools we have six normal schools that now offer courses of study whose credit will be accepted by any State in the Union. In addition to the normal schools we have the West Virginia University with a number of colleges and schools, affording a wide range of opportunities for college and professional work. Besides the University we have something like a dozen of prominent private and denominational institutions in charge of competent men, whose efforts are in harmony with the proper standard, which afford a diversity of social and school life conditions with the very best opportunities for the proper growth and development of our young people.

In addition to these we have two institutions of first class ability for the higher training and development of the colored youth of the State, besides having an interest

in a third institution which has gained a reputation for the quality of its work.

The schools for the deaf and blind have been enlarged and improved and the State has manifested a disposition to provide greater comforts and more adequate training for this class of our citizenship.

The industrial schools for boys and for girls have demonstrated their ability to supplement and re-enforce the work of the public schools and they are doing no little toward making West Virginia a better place in which to live.

The diversified interests of the State afford a great variety of opportunities for industrial life, but these things have not occupied the minds of the people to the exclusion of things intellectual. It is gratifying to note that a large number of single-room rural schools even are supplied with libraries for the use of the children and the patrons of the community. In one county every single school has a library and in numerous other counties the larger number of the schools are thus equipped. We find that, although the library movement is only ten or fifteen years old, we have at this time 372,146 volumes in our school libraries.

As a demonstration of the State's faith in education and the liberality of her patriotic citizens, I wish to cite the fact that we spent last year for the elementary and secondary schools of the State \$5,911,000 and our expenditures for all of our educational institutions, including the University, amounted to \$6,560,760. We have school property valued at \$16,668,000. Two of the leading cities of the State, Charleston and Parkersburg, have recently found a demand for greater high school facilities, and have voted \$300,000 bonds for the equipment of a thoroughly modern city high school.

New Tasks and Movements.

A regular school system from the primary grade through the State University having been thoroughly established

and closely knitted together, the educational leaders are now meeting new tasks. The rapid industrial development caused a sudden rush to our towns and cities and thus robbed the country of many leading families. It became more and more apparent that social activities, especially those connected with the schools, were on the decline. To meet this situation and to make a wider use of school property, the Social Center campaign was started in 1913. The State Superintendent called for one thousand teachers to volunteer to hold social center meetings in rural school houses, and the Supervisor of Rural Schools prepared a suggestive hand book as a guide in this new movement. Fifteen hundred teachers volunteered in this new work. Thousands of meetings have been held under this call; neighborhood ideas have been crystallized into good community undertakings; and wholesome social opportunities have been given to old and young.

Just now the State is showing signs of an awakening on the subject of adult illiteracy, and the lack of the adaptation of our schools to the needs of grown-ups and youths at work. A Commission is at work on this question, and definite plans are being made to offer short informal courses in our secondary schools, and to organize special classes for those who wish to go to school only part time; and to establish night schools for day laborers. In short, our school system is attempting to reach out a helping hand to all who are seeking or needing encouragement and instruction.

There was a time not so very long ago when West Virginia, perhaps, might have offered some apology for her meager school facilities, but that day has passed. Let any prospective citizen of the State be assured that if he bring his family to the Mountain State, there will not only be abundant facilities for thorough and liberal education of his children, but he will find such interest and public spirit in matters of education as to afford the greatest possible encouragement for their highest moral and intellectual development.

Manufacturing in West Virginia.

West Virginia is so rich in coal and mining has come so naturally as a consequence of this possession that the State's advantages as a manufacturing community have been largely overlooked and neglected. Yet West Virginia will not be able to reap the rich harvest that is due her until her manufacturing potentialities are fully developed, and mining has become the secondary instead of the prime industry of the State. The vast deposits of coal, the great oil pools, the immeasurable gas supply, the innumerable opportunities for hydro-electric development—these form a mighty sum of advantages for turning raw material into finished products, giving promise of a tremendous growth for the near future.

But even though the various manufacturing interests of West Virginia have not reached that condition of development which the State's natural advantages would seem to warrant, they are at present of very considerable magnitude, and their growth during the last decade has been rapid and steady, while circumstances give assurance that the growth will be still more rapid in the immediate future. In 1899 the number of manufacturing plants in the State was 1,824; in 1904 it was 2,109; in 1909 it was 2,586; in 1914 the number was estimated to be 3,000. The

capital employed in 1899 was \$94,103,000; in 1904 it was \$86,821,000; in 1909 it was \$150,923,000 and in 1914 it was estimated to be \$225,000,000. The value of the products of the factories in 1899 was \$67,007,000; in 1904 it was \$99,041,000; in 1909 it was \$161,950,000; and in 1914 it was estimated at \$225,000,000. The wages paid in 1899 amounted to \$12,640,000; in 1904 to \$21,153,000; in 1909 to \$33,000,000; and in 1914 were estimated to be \$45,000,000. Raw materials used in 1899 were valued at \$37,228,000; in 1904 at \$54,419,000; in 1909 at \$92,878,000; they were estimated in 1914 to be worth \$125,000,000. The number of persons employed in 1904 was 48,880; in 1909 it was 71,463; for 1914 it is estimated at 95,000.

The making of lumber into its various finished forms constitutes the leading manufacturing industry of the State as measured by both number of people employed and value of products. The mills and other manufacturing plants engaged in handling lumber and timber products in 1909 was 1,016, and they gave employment to 18,643 people and turned out products valued at \$28,758,000. The number for 1914 is estimated at 1,300, their employees at 24,000, and the value of their output at \$40,000,000.

Iron and steel products follow lumber in value of output,

with a value of \$22,435,000 in 1909 and an estimated value of \$30,000,000 in 1914.

The value of the tannery products was \$12,451,000 in 1909 and estimated at \$15,000,000 in 1914. Glass, \$7,779,000 in 1909 and estimated at \$10,000,000 in 1914. Flour and grist mill products, \$7,696,000 in 1909 and estimated at \$9,000,000 in 1914. Meats and slaughter-house products, \$3,764,000 in 1909 and estimated at \$5,000,000 in 1914. Foundry and machine shop products, \$3,392,000 in 1909 and estimated at \$4,500,000 in 1914. Cars and general shop construction and repairs by steam railroads, \$6,733,000 in 1909 and estimated at \$8,500,000 in 1914.

These are followed by pottery, fire clay and terra cotta products, paper and wood pulp, copper, tin and sheet-iron products, printing and publishing, bread and bakery products, clothing, patent medicines and compounds and druggists' preparations, woolen, worsted and felt goods and wool hats, furniture and refrigerators, brick and tile, carriages and wagons and materials, lime, canning and preserving, bone, carbon and lamp black, ice, leather goods, marble and stone work, mattresses and spring beds, confectionery. In addition to these there are 321 industries listed in miscellaneous that had an output valued at \$37,262,000 in 1909, and estimated at \$43,000,000 in 1914.

Large as the increase in manufacturing has been in the last decade, it is expected to be very much larger in the near future. The development of newly discovered deposits of glass sand, lying in close proximity to newly tapped gas fields, will, no doubt, cause the construction of new glass plants in various towns and cities in the new gas districts.

There has recently been a tremendous increase in the pottery business in various places in the State, and those competent to speak on the subject confidently predict a further expansion of vast proportions. The growth of this business has been brought about chiefly by the cheapness with which gas could be secured, that fuel having been recognized as the ideal one for pottery purposes. The manufacture of ornamental tile, roofing tile and kindred articles has also been largely increased in the past five years.

A very considerable industry that is capable of large expansion is that of the production of limestone products. In the region about Martinsburg limestone exists of such purity that it is in great demand both as a flux for iron ore and for the manufacture of hydrated lime, agricultural lime and lime for other purposes. One of the most modern lime plants in the country has been erected recently just outside the limits of Martinsburg, where hundreds of tons of these various products are being turned out each month. Crushed limestone for macadam, for railroad ballast and for numerous other uses is also being produced there and in various other of the State's limestone regions.

Limestone and other ingredients necessary to the manufacture of an excellent grade of Portland cement lie close together in some sections, and one plant in Preston county makes a considerable quantity of that material each year.

There are so many different kinds of manufacturing plants the location of which should be—and in the final analysis must be—influenced or controlled by the quality and price of fuel, that the advantages of West Virginia with respect to that feature must finally prevail, when the State will take its place among the leaders in the possession of manufacturing industries.

Add to the possession of fuel and water power the advantage of location and transportation which the State enjoys, and you have a combination which only needs raw materials to become ideal. Many of these latter the State has, and others can be readily and cheaply brought in to it as can the fuel necessary to their manufacture be transported elsewhere.

With the utilization of the Panama Canal and the immense trade which this country will eventually develop in the countries to the south, the Ohio Valley, with the Ohio river rendered navigable from Pittsburg to Cairo the year round, will unquestionably become the country's greatest manufacturing district, and West Virginia will inevitably be the busiest part of it. It is but a question of time when sea-going barges will be loaded at Ohio and Kanawha and Monongahela river wharves with freight destined for points in countries south of the canal, where they will discharge cargoes until then unbroken. This will mean that West Virginia factories can send their products to such countries at rates of freight impossible of duplication except to such factories as may be as greatly favored as they with respect to fuel, raw material and transportation facilities. And these will not be many.

Recently many of the towns and cities of the State have been making organized efforts to secure manufacturing plants. In many of them ground for sites has been purchased so that it may be sold at reasonable prices to worthy concerns, while some of them have secured a supply of gas so that it may be furnished factories for a number of years at low prices. In this way a number of manufacturing concerns of great importance have been brought into the State to furnish employment for labor and add to the general prosperity of the Commonwealth.

Wheeling, Parkersburg, Huntington, Charleston, Clarksburg, Fairmont, Grafton, Morgantown, and others have well organized commercial bodies that are making a business of presenting the advantages and opportunities offered by their towns to enterprises seeking locations, and each of them has been successful to a marked degree, and each of them has felt the impulse of new life that comes from well-made effort.

One of West Virginia's advantages as a location for manufacturing plants is its excellent climate. Men who work at exhausting employments during the day, and who can return day after day refreshed and rested by a good night's sleep, are able to give the best that is in them year after year, whereas, those who during certain months of the year are deprived of their proper rest by nights too hot for sleep soon become exhausted and worn out. West Virginia is free from hot nights, and in the factories within her borders the manufacturer is sure of getting the best service from those he employs. This is a feature of special interest and importance to those manufacturing plants in which men work in intense artificial heat, and one always taken into account by employers in such plants who fully know their business.

The State's unrivalled advantages make it the most inviting field on the continent for those who would devote their capital and direct their energies to the development of manufacturing industries.

The opportunities are here; only men of brains, enterprise and money are needed to transform them into realities.

Clay County.

Clay county lies slightly to the southwest of the central portion of West Virginia, having been formed in 1856 from portions of Braxton and Nicholas. In area it is 390 square miles and in 1910 it had a population of 10,251, an increase from \$248 in 1900. In 1890 the population was 4,659. Elk river runs entirely through the county from northeast to southwest, its principal tributary within the county being Big Buffalo creek, which empties into it just opposite the town of Clay, the county seat.

Practically the entire area of the county was formerly densely wooded, and the cutting of timber and manufacture of lumber was for many years the most important industry. The timber consisted for the most part of poplar and oak, both of the best quality, with a large percentage also of chestnut, hemlock, hickory, beech and maple. While much of the land has been cut over, there still remains a large amount of timber to be taken out, with a few boundaries of forest from which no trees have yet been removed. These virgin boundaries, together with the areas once cut over, but still holding considerable valuable timber, will furnish work for a number of mills for a good many years to come.

Portions of the county are underlaid with certain of the Kanawha coal measures, some of the seams existing there being of the very highest quality. At present there are but three or four operations in the entire county, but the product from these bring the highest price paid for high-volatile coals. These coals are especially adapted to domestic purposes and where they have been introduced are extremely popular. One of the most successful coal operations in the State is located on Buffalo creek some fifteen miles from its mouth. This operation produces about 1,000 tons a day throughout the year. During the year 1914 the mines on Buffalo were shut down for only three week days, and during the first half of 1915 they had not been shut down for a single week day. Other smaller operations are at Pisgah, on the river a short distance below the town of Clay, at Dorfee, about ten miles farther down the river, and at Queen Shoals at the county's southern extremity. The total output of coal for the fiscal year ending June 30, 1914, was 396,411 tons, by far the greater part of which came from the Buffalo mines.

In 1910 there were 1099 farms in the county, with a total area of 83,093 acres. This was an increase of 139 in number and of 13,791 acres in area since 1900. The value of farms and farm property increased 120.8 per cent. from 1900 to 1910. The principal crops raised are corn, oats and wheat, in the order named. Other field crops are grown to some extent, hay and forage crops are being produced in increasing quantities, and truck crops, fruits and berries are being given much more attention than formerly, with the result that they now form a very important part of the agricultural business of the county. With the decrease in the lumber industry caused by the closing of the big mills after the first cut-over of the large boundaries of timber, agriculture began to receive more attention than formerly, and will unquestionably grow into more importance within the next few years. The bottom lands of the Elk river and other streams throughout the county are of good soil, and the rich coves and fertile hillsides offer inviting opportunities for the farmer,

the grazier and the fruit grower. The value of improved bottom lands is \$50 per acre; improved uplands, \$10; woodland, \$5; timber lands \$25.

The Coal & Coke railroad runs entirely through the county, following the course of the Elk river. Connecting with the Chesapeake & Ohio and the Kanawha & Michigan roads at Charleston, with the Baltimore & Ohio at Orlando and the Western Maryland at Elkins, this road furnishes the people of Clay with excellent facilities for reaching all the country's principal centers of population and commerce, north, east, south and west.

Within the last half dozen years there has been a considerable oil and gas development in Clay county. In various sections small oil wells have been drilled in, and the production of gas has become a very important factor in several localities. Up to the present time the gas is being used principally in the manufacture of carbon black, an industry of some importance in the southwestern portion of the county. While there has been no great pool of oil or gas found as yet within the boundaries of the county, the fact that both substances have been found in so many different localities leads to the opinion that somewhere between the outlying points great deposits but await the coming of the drill to bring Clay into instant prominence as a producer of oil and gas.

The school system of Clay county has been kept abreast of the progress made in other sections of the State, and furnishes the boys and girls of the various communities ample opportunity for securing sufficient education to fit them for the every day business of life, or for further courses of study, if they elect to follow them. There were 81 schools taught in the county the last school year. A very considerable improvement in school buildings has been made in the past few years, and those found in the rural districts of Clay will compare favorably with like buildings of any other county in the State. At the town of Clay there is a County High School with a faculty of five teachers and a course of study that prepares the pupil for entrance to colleges of high grade. This High School has been in operation only a few years, but already its influence is being felt in the impulse given educational matters throughout the limits of the county.

Elk river is accounted one of the most beautiful streams in America. Its water is clear and pellucid, and the wooded heights on either side, while lacking the rugged picturesqueness of some of the rougher mountains of the State, make the Elk valley from end to end one of great attractiveness. The river abounds in game fish, and hundreds of persons from the cities and towns of West Virginia and other States may be found camping on its banks during the fishing season to take advantage of the opportunity offered the devotees of rod and reel.

To those seeking the peaceful pursuits of rural life Clay county offers many inducements. Good lands may be secured at low prices, and there is unquestioned profit in farming and stock raising when carried on with industry and intelligence. The people are hospitable, peaceable and free from factional or feudal troubles and disputes. Of the population of 10,251 in 1910 all but 23 were native born whites. The homogeneity of the population makes for peace and progress and is a particularly attractive feature to the man who is looking for a community in which to found a business, build a home and raise a family.

Greenbrier County.

The county of Greenbrier, lying high up on the sides and even reaching the peak-tops of the Allegheny mountains, is one of the oldest in West Virginia, having been formed in 1777, the second year of the Revolutionary War. It is the second largest county in the State, having an area of 1,000 square miles. Topographically its contour is that of a sort of basin, rimmed around by mountains, while the central portion is a wide plateau with rolling surface. This latter portion is covered for the most part with soil of great agricultural value, divided into fertile farms and dotted here and there with comfortable, hospitable homes.

In natural resources the county is particularly rich. In the westward portion the surface is underlaid with the famous New River coal measures, than which there are none more valuable; iron ore of high grade is found on Anthony's creek and Howard's creek in the eastern section; limestone marble occurs on Beaver Lick mountain; gray marble lies in the hills overlooking the Greenbrier river; gypsum is plentiful about the mouth of Second creek; sandstones of excellent quality for building, and with fine grit for grindstones are numerous and widely distributed, and limestones of all grades for agricultural, building and other purposes abound in all sections. At one time the entire area of the county was covered with magnificent forests that embraced all the varieties of timber known to this latitude, and while many thousands of acres of these forests have been felled to make way for the advance of agriculture, in the more mountainous sections of the county, at the east and west, splendidly wooded areas still stand, virgin to the woodman's axe.

The great seams of coal lying in this county have not yet been developed commercially, owing to the lack of transportation facilities, but the time is not far distant when the demand of the markets will cause this development, and western Greenbrier will become one of the prominent coal producing sections of the State. Already a railroad, built for the purpose of hauling lumber from the wooded reaches of the western section, has penetrated the coal area, and the mining and shipping of coal will soon follow.

It is doubtful if any portion of the State has ever carried a larger quantity of timber to the acre, or timber of a higher quality, than that which stands within the boundaries of Greenbrier county on the waters of Meadow river, which drains its western slope. The streams being too rough and precipitous for use in floating logs to the market, thousands of acres of these forests have to this time stood untouched, and it is only within a very short time past that railroad transportation has been provided and great mills built for the purpose of cutting and carrying out their products to meet the country's demand. Near the eastern limits also there is yet considerable timber to be cut, and a lumber road built from the Chesapeake & Ohio at White Sulphur Springs northward up Anthony's creek serves to carry the output of a number of mills. However, so large is the area of the county, and so vast the forest growth still undisturbed, that it will be many years before the song of the saw mill will be last heard within its borders.

But with a beginning far back of the commercial development of mine and forest, and destined to flourish after the products of both have been exhausted, agriculture has been and will continue to be the most important

branch of Greenbrier county's industrial life. For nowhere in this State or out has nature's generous hand brought into conjunction more of those qualities of soil and climate, of mountain and stream that must of necessity meet to bring certain phases of agriculture to their highest state of development. The underlying rock formation, throughout practically the entire county is limestone, the soil is composed principally of clay and calcareous matter, largely mixed with humus, highly fertile and of a fine lasting quality. It is well adapted to the production of corn, wheat, oats, buckwheat, sorghum cane and the best of the hay and forage grasses. In the amount of corn raised Greenbrier county stands about sixteenth in the State, those that lead it being counties that have a large proportion of low-lying bottom lands. In wheat Greenbrier stands about seventh and in oats about twelfth.

The soil and altitude of the plateau region of Greenbrier are especially adapted to the growth of bluegrass, and not even the far-famed bluegrass region of Kentucky can excel it in this respect. Bluegrass is, indeed, indigenous to Greenbrier, and as soon as the forest is cleared away it springs up and covers the ground. This has caused Greenbrier to become one of the leading stock growing counties of West Virginia, and Greenbrier stock of all kinds has become famous throughout the country. No better horses and mules are raised anywhere than those that are nurtured and strengthened by Greenbrier bluegrass. Beef cattle raised on her bluegrass sod have achieved great popularity in the markets of the East, and thousands have been sent to export to meet the foreign demand for America's best. Sheep thrive on the bluegrass also, and the production of both mutton and wool is extensively engaged in by farmers in some portions of the county. Of recent years dairying has been carried on in a large way, and vast quantities of milk and cream and hundreds of thousands of pounds of butter are shipped out of the county to various markets east and west.

Another important part of farm life in Greenbrier, and one that will become yet more important, is the raising of poultry. The climate is well adapted to the business, and all the various kinds of domestic fowls can be raised with little trouble. Thousands of chickens, turkeys, ducks and geese are shipped each year to the markets of Washington, Baltimore and other Eastern cities, and hundreds of thousands of dozens of eggs. The Greenbrier turkey has come to have a popularity all its own in some of the Eastern cities, and certainly none finer find their way to the markets from any other sections of the country.

While there has been little commercial orcharding done in Greenbrier there has been a great deal of fruit raised for home consumption. Nowhere do apples of finer size or more exquisite flavor grow, and with the increasing demand for the highest quality in that kind of fruits, the lands of Greenbrier must soon come into great demand. In fact there have been some orchards of more than ordinary size put out within the last few years, and it is expected when these come into full bearing, giving absolute demonstration of what can be done by the application of scientific methods to high grade varieties, a large impetus will be given to the production of apples in the county. Peaches also yield well, and where proper varieties are planted are of a most delicious flavor. Pears, plums and cherries bring forth abundantly wherever given

the opportunity. Small fruits of all kinds suitable to the climate produce large crops of a high degree of excellence.

For truck crops, potatoes, cabbage, lettuce, onions, beets, radishes, beans, peas, cauliflower, etc., the soil of Greenbrier seems perfectly adapted, and while little trucking is done for the market, the home gardens that are almost universal throughout the county have amply demonstrated what can be done in that line.

The mineral springs that abound in Greenbrier have been the means of attracting much attention to it. Chief among these is the White Sulphur, long the most popular and most famous of watering places in all the South, and now enjoying a wider degree of popularity and a greater patronage than ever before in its history. Other springs whose waters are of high medicinal value, but whose fame is not so widespread as that of the White Sulphur, are found in various sections of the county.

In the matter of transportation facilities Greenbrier is served by the main line of the Chesapeake & Ohio Railway, running in a general east and west direction; by the Greenbrier river division of the same railway, extending from Ronceverte on the main line up the valley of the Greenbrier river into Pocahontas county; by the Iron Mountain railroad, from White Sulphur Springs northward up the valley of Anthony's creek, and by the Meadow river branch of the Chesapeake & Ohio, which reaches to Rainelle, in the western edge of the county. The Chesapeake & Ohio gives excellent service to the various centers of population and commerce both east and west, and the laterals serve to bring the sections which they penetrate into close touch with the main line.

The country roads of Greenbrier are far better than the average of roads throughout the country. The limestone found in practically every part of its territory has been extensively utilized in macadamizing the highways, over which the produce of the farms can be easily carried to the various railway stations on their way to market.

Recently renewed efforts have been made to improve old roads and make new ones, and it is but a matter of time when Greenbrier county will rank among the leaders of the State with respect to highways of the most approved kind.

The principal water courses of the county are the Greenbrier river, one of the most picturesque and beautiful streams of the State, which flows through the county in a north to south direction; Meadow river, which waters the western section; Knapps creek, Anthony creek, Howard creek, Section Creek and Clear Creek. These are all clear mountain streams, most of them filled with bass, trout and other game fish, thus furnishing fine sport for the angler in season.

Greenbrier has for years prided itself upon the excellence of its public schools, and they have progressed with the general progress of the county until they are now among the best in the country. More than two hundred school houses have been builded for the accommodation of the young, and the average attendance is as high and the instruction as efficient as may be found anywhere.

In the town of Ronceverte is a high school with an excellent corps of teachers and a course of study equal to the best high schools of the State. A graded school running from primary to eighth grade, which is next below the high school, is also maintained in Ronceverte, conducted by teachers of ability and experience. In Lewisburg there is a graded school also of high merit. In both these towns there are carefully conducted schools for colored pupils. The scale of salaries in Greenbrier is as high

as elsewhere in the State, and the consequence is that teachers of ability have always been obtained. A large percentage of these are college and normal school graduates.

The county seat of Greenbrier is the fine old town of Lewisburg, one of the most widely known and historic municipalities of the State. Lying in a bowl-like depression of the kind so common in limestone regions, surrounded by a succession of hills that rise on all sides, the site of the town is one of great natural beauty. It is four miles from the Chesapeake & Ohio railroad where in its western flight it first crosses the Greenbrier river, and an equal distance from Ronceverte, the principal station of the road in the county. From Lewisburg to Ronceverte an electric road has been constructed, whose cars meet all trains, giving convenient service to the traveling public.

Lewisburg has long been noted for its citizenship of culture and refinement, and for its homes of the most cordial hospitality. When West Virginia was a part of the Old Dominion Lewisburg was one of the points at which the high courts of the Commonwealth held their regular sessions, and the consequence was that it became the place of residence of an able and educated class of men and women, whose sons and daughters have succeeded to leadership in its business, social and municipal life, and have kept alive the spirit of gentle courtesy and gracious simplicity that so well became their progenitors.

The town has long been known as an educational center, and is now the seat of two schools of unusual merit, the Lewisburg Seminary for young ladies and the Greenbrier Presbyterian Military School for boys. Both these institutions are conducted under the auspices of the Presbyterian Church, and both are attended by pupils from a wide range of States. The high altitude of its location, the pure, wholesome air of the mountains, and the fine intellectual and moral atmosphere of the town combine to render it an ideal place in which to train young men and young women for a future of high endeavor.

Of recent years a number of men who have finished their business careers in other communities, wishing for a place in which to establish their families and educate their children, have purchased property in and about Lewisburg, and are there making their homes. Possibly there is no other town of like size in the entire State where there are so many homes of cultivated elegance, or homes in which such genuine hospitality is so generously dispensed.

Most of the leading religious denominations are represented by churches and congregations, and the tone of the community is distinctly religious. There is nowhere in West Virginia a more delightful spot in which to establish a home and raise a family.

Two strong banks do a thriving business in handling the financial affairs of the prosperous merchants and well-to-do farmers of the town and the surrounding country. The town is well lighted by electricity, and an ample supply of pure water is pumped from the Greenbrier river into the mains which carry it throughout the corporation limits.

In former days Lewisburg was a popular stopping place for travelers, being situated on one of the most famous stage coach roads between the East and the West. Much the same kind of popularity has come to it again by reason of its easy access to automobile tourists over roads lying through regions of great scenic beauty, and leading to a town combining so many interesting features.

Harrison County.

The coming of the white man to Harrison county dates back to 1764, when the Pringles and others left Fort Pitt and pitched their tents in Tygart's Valley. Others were attracted, and within five years a number of families had erected cabins in the same vicinity. During the same years, 1764-69, the Buckhannon Valley became peopled with hardy pioneers. In 1770 Booth creek received her first settlers and two years later cabins had been reared and occupied on Simpson's and Hacker's creeks. In 1764 John Simpson, a trapper, built a cabin opposite the mouth of Elk creek, and that was the humble beginning of the beautiful city of Clarksburg, county seat of Harrison county. This favored location was soon honored with other settlers, and for several years was the rendezvous for trappers and hunters who roamed the forests in search of game.

Harrison county ranks fourth among the thirty-three coal producing counties of the State in the production of coal, the State Mine Department's report showing that for the fiscal year ending June 30, 1913, 4,812,472 tons were mined from sixty-seven operations. Of this amount 4,725,937 tons were shipped from the mines to outside markets. Most of the remaining coal was used for steaming locomotives, gas having supplanted coal as a fuel both for home and manufacturing purposes. Of the sixty-seven mines operated, twenty-seven were controlled by a single coal company; five by another; and three by another. The largest producing single operation for the year was the Marshall Coal Company with 251,246 tons. Harrison county produced for the same year, 13,107 tons of coke.

Up to the beginning of the fiscal year 1914 only 875 acres of coal had been worked from the commercial mines. The coal development so far has been only along the line of the Baltimore & Ohio Railroad between Marion county on the North, and Lewis county on the South. The famous Pittsburg vein is prevalent. Vast fields from the eastern side of the county to Doddridge on the West are practically untouched. Many tracts have been surveyed and tested by core drills, and offer a fine field for investment for future profits. Many of these tracts have railroad frontage, and the entire undeveloped fields can be reached by a reasonable expenditure of capital for spur trackages from the various branches of railroads reaching out into the county in five directions from the county seat.

The following comparative statement, beginning with 1898, will indicate how the mining interests have grown and fully warrants the assertion that several millions of capital have been invested by the various coal operators in Harrison county:

1898	-----	271,554 tons
1902	-----	1,622,144 "
1907	-----	3,343,319 "
1913	-----	4,812,472 "

Each succeeding year from 1898 shows a steady and continued growth in the coal production of the county, and the indications are that Harrison will, for many years to come, maintain her position near the top of the list in the annual production of coal.

The first gas was brought to the surface and utilized for domestic and commercial purposes in Harrison county more than twenty years ago, and many wells of that age are still producing, the diminution of pressure being slight. State Geologist I. C. White has stated that the gas supply of West Virginia is good for thirty years, and the present wonderful supply of Harrison county seems

to be good for a much longer period, and the manufacturers, and other users of gas will probably be the last to switch to some other fuel. Even then, the coal supply will be amply sufficient at an exceedingly low rate per ton to supply any possible exhaustion of the gas supply, which is now being used as fuel in the operation of large chemical works, glass and pottery plants, as well as all kinds of enterprises requiring a cheap fuel. Harrison county and the city of Clarksburg are now supplying gas for manufacturing purposes at the low rate of four cents per thousand cubic feet, and this fact is bringing new enterprises to this county. The gas found in this gas producing belt has been shown by tests to register 1,140 British thermal units as compared with an average of 700 units for the gas wells supplying Pittsburg, and with a less average for Cleveland and other manufacturing centers more remote from this section of West Virginia. Compared with actual fuel cost in other cities, British thermal units considered, gas here as a fuel is costing actually little more than two cents a thousand cubic feet. The natural gas of the State is largely transported through pipe lines to nearby States, but a large proportion of the supply is being converted into factory power. The main lines of the large gas corporations pass through Harrison county, and feeders tap all the fields in this vicinity.

The production of oil in recent years in Harrison county easily places this section in the lead of oil producing lands in the State. The Sardis district with its immense producers during the past two or three years, has made the best showing. Many of the wells in this section paid for themselves in oil production within a few days after opening, and they have far exceeded the wells of other sections in steady production and staying qualities. The oil producing lands of Harrison are in the center of the vast field extending from below Weston in the South, to Mannington on the North. West Virginia stands first of all the States in the production of natural gas; second in the production of coal; and is high up the list in the production of oil, therefore its nickname the "Fuel State."

Cheap natural gas has brought to Harrison county a large number of glass factories, all located in or near Clarksburg, and the location of others is contemplated. Those already located and in operation have an estimated investment of capital in plants of nearly \$3,000,000.00 with an annual pay roll when business is normal of about \$1,500,000.00. Workmen to the number of 2,000 are employed in the glass plants, and their products are estimated at \$4,300,000.00. Among other manufacturing enterprises are large chemical works, a sheet and tin-plate mill, pottery works, as well as numerous smaller industries, including coffin and casket factory, lumber mills, flour mills, box factories, oil well supplies, brick works. Something like \$7,000,000.00 is invested in these manufacturing enterprises employing in the aggregate nearly 3,000 men, with a total annual pay roll exceeding \$2,000,000.00, and an annual output of about \$20,000,000.00. Including glass plants, more than \$9,000,000.00 is invested in manufacturing enterprises employing in the aggregate 5,000 men, with an output of more than \$24,000,000.00.

The agricultural and stock raising possibilities of Harrison county are immense, but owing to the great natural wealth in unbounded fields of coal, the greatest gas wells known, and an oil production almost unsurpassed, agricultural and horticultural pursuits as well as stock raising have been more or less neglected. Stretching throughout



COURT HOUSE (TOP CENTER) AND SCHOOL BUILDINGS IN HARRISON COUNTY.

the length and breadth of the country is a fine agricultural and fruit country. The farms of the county are generally free from encumbrance, but State figures indicate that the value of farm implements in Harrison county only average \$90.00 per farm. Considering the fact that this naturally rich but undeveloped agricultural State imports annually over \$6,000,000.00 worth of vegetables alone for family consumption, the opportunities for truck growing and intensive farming abound on every hand. The market for all home grown products is exceptional, the best of prices prevailing at all times in the cities and coal mining towns and villages, therefore truck farming is a most inviting field, large returns on investments and labor being assured. Crops are always assured, due to the character of the soil, abundance of rainfall and equable climatic conditions. Fruits of nearly all kinds thrive with only slight attention. Blue grass grows to the very summit of the hills and mountains, thus affording excellent grazing for cattle and sheep, with a market assured right at home. So that cattle raising can be accomplished as profitably as in any section of the country.

Harrison county will soon have a system of hard surface roads unequalled in the State, and it is being done by direct taxation, without the issuance of bonds or other objectionable form of liability. The people of Harrison county prefer the "pay as you go" system. Last year the county spent \$146,000.00 in the construction of hard surface roads, consisting of brick with stone base; brick with concrete base; warrenite, half tarvia-bound, Mexican asphalt-bound macadam, and three-course macadam. The county now has eighteen miles of the above described roads outside the cities and towns, practically all having been constructed within two years. Under the direction of the county road engineer, it is planned to construct at once additional new roads as follows: One and one-half miles of brick; three miles of tarvia-bound macadam; two miles three-course macadam; two miles material undecided. The bridge and culvert situation in the county is well cared for. There are sixty concrete bridges and culverts, many iron bridges and several substantial covered bridges. One steel bridge was erected last year at a cost of \$46,000.00.

Because of the cheapness of natural gas as a fuel, both for manufacturing and domestic use, Harrison county offers wonderful opportunities for the development of all kinds of manufacturing enterprises in which cheap fuel enters as one of the features of low cost of production. Gas is utilized as fuel in the generation of electric current, either for lighting or power purposes. The manufacture of glass and glass products has already placed Clarksburg well towards the front as a manufacturing center. Fuel-gas makes it possible for all kinds of plants to be operated economically without the dust, smoke and grime so noticeable in cities where coal is used for the generation of power. Clarksburg alone had thirty acres of free factory sites, most of which have been taken up, and exceptional opportunities await capital in other sections of the county and invite the location of new industries such as iron and steel mills, tin plate mills, chain factories, enamelling plants, glass works, potteries, chemical works, fertilizer factories, nail mills, tube mills, shoe factories, textile plants, and in fact any line of manufacturing where the cheapest fuel in the United States is desired, as well as exceptional transportation facilities.

Harrison county ranks second in property valuations for the year 1914 as shown by the books of the assessor.

Real estate valuations are placed at	\$39,839,265.00
Personal property	19,400,564.00
Public service tax	22,427,081.00

Total ----- \$81,666,910.00

The county is fourth in the production of coal; first in the production of natural gas, and ranks among the first in the production of oil. It is believed by those conversant with industrial conditions, that in a very short time, the taxable values of Harrison county will reach \$100,000,000.00.

Harrison county has as good transportation facilities perhaps as any county in the State. Main lines of the Baltimore & Ohio Railroad system cross the county from North to South, and from East to West. Centering at Clarksburg, the county seat, another line passes out through the northwestern section of the county, reaching the Ohio river at New Martinsburg. The main line from Parkersburg to Grafton passes entirely through the county from West to East, giving direct connection with Washington, Baltimore and eastern seaboard cities. Through other connections, Charleston, the State Capitol, is reached with the least possible delay. The Baltimore & Ohio furnishes direct transportation facilities to Wheeling, Pittsburg, Columbus, Cincinnati, Chicago and St. Louis.

In addition, the facilities furnished by this great system, the Monongahela Valley Traction Company, with one hundred and eleven miles of trackage, furnished hourly trips from Clarksburg to Weston on the South; Shinnston, Fairmont, Fairview, Mannington and intermediate points to the North. Beside the transporting of passengers at regular hourly intervals, a freight traffic is conducted over these traction lines which has materially aided in stimulating trade between the many prosperous towns of the Monongahela Valley, and has also stimulated agricultural pursuits and truck gardening as quick and easy transportation to the markets is secured for the farmer.

As to educational advantages, no county in the State ranks higher than Harrison county, and the common and high school of Clarksburg rank among the best cities of the country. The free school system is in a remarkably healthy condition, free from political intervention and partizan politics. Men and women, as teachers, principals and supervisors are selected for their real worth and as a result the schools of Harrison county and Clarksburg are looked upon as models for other communities. Great developments have been wrought in the public school system of the county in the past decade. New and handsome buildings have been erected at a cost of several hundred thousand dollars, and modern courses of study have been adopted and put into force. The teaching force has been greatly increased. The county is subdivided into ten magisterial or school districts and four independent districts.

There are one hundred and ninety school buildings in the county, a large proportion of which are equipped in the most modern way. Four hundred and fifteen teachers, principals and supervisors are employed.

There are twelve high schools in the county, five being of the first class; three of the second class and four of the third class. The total number of high school pupils enrolled, seven hundred and eighty-two. The total enumeration of children of school age in the county for the term 1914-15 is 15,598, with a total enrollment of 11,842. It is not uncommon for people to move into Harrison county from other sections of the State because of the excellent educational advantages offered their children.

Kanawha County.

Kanawha, fourth in area, third in wealth and first in population of West Virginia counties, lies southwest of the central portion of the State, and is fully embraced in the Kanawha Valley. The Great Kanawha river, entering the county from Fayette on the east, flows entirely through it in a northeasterly direction; the Elk, coming in from Clay, flows southwesterly to join the Kanawha at Charleston; the Coal comes in from Boone on the south and runs north to empty into the Kanawha at St. Albans; the Pocataligo flows in from Roane, crosses the northwest corner of the county and empties into the Kanawha just across the line in Putnam. These rivers, with numerous large creeks and myriad small ones, form a drainage system for Kanawha not surpassed anywhere. Considering the fact that it is one of the old counties of the State, Kanawha had a wonderful increase in population between 1900 and 1910, during which period it grew from 54,696 to 81,457. The growth from 1890 to 1900 was from 42,756 to 54,696. In assessed valuation of property it increased from \$10,166,000 in 1904 to \$77,000,000 in 1915.

Agriculture in Kanawha.

The broad bottoms that border the Great Kanawha and the smaller ones that lie along the other streams are fertile of soil and well adapted to the production of both field and trucking crops of all kinds known to this latitude, and agriculture has always been one of the county's most important branches of industry. Of the total 550,400 acres lying within the boundaries of the county 252,402 are embraced in its 3,807 farms. The total value of farm property for the year 1910, the last for which accurate figures are available, was \$8,946,190, and the value of the crops produced annually runs into the millions of dollars. These crops are principally corn, wheat, oats, hay and forage, Irish potatoes, tobacco, and the various vegetables and fruits.

Recently there has been a considerable increase in trucking throughout the county, and more especially in those sections lying near Charleston, the principal city, and in proximity to some of the mining villages. These communities furnish excellent markets for the products of truck gardens, and the supply of home grown vegetables still falls far short of the demand.

While the agricultural industry in Kanawha is greatly overshadowed by the coal business, it nevertheless plays a very important part in the county's progress and prosperity, and will unquestionably advance to a still more important place in the future, as improved methods of farming are forced upon the farmers by changing conditions. There is much good farming land in the county as yet unimproved, and this will eventually be brought under the dominion of the husbandman and made to yield its share for the general prosperity of the people.

The Coal Industry.

Kanawha county is largely underlaid with what are known as the Kanawha coal measures, embracing such well known and popular seams as the Lewiston, the Eagle, the Cedar Grove, the Coalburg, the Winifrede, and others. These Kanawha coals are of the kind classed as "high-volatile," being especially well adapted to purposes requiring coal of a gaseous, quick-burning type. In addition to these bituminous coals a number of deposits

of cannel coal have been discovered in the county from which many thousands of tons have been taken. This latter coal is extremely popular for grate purposes in certain sections of the country, where it is sold for a price largely in excess of that received for the ordinary bituminous coals.

Coal was first discovered in Kanawha in 1817. In that year John Turner came to the county from Pittsburg and entered into a contract to supply wood for certain of the salt furnaces then abounding in the valley. He found coal on Burning Surings run, two miles above the town of Malden, and made a contract with one of the furnaces to supply it with that fuel instead of wood. Its superiority over wood was soon established, and before long it was being used by all the salt makers throughout the territory. Soon afterwards coal mining as a commercial proposition was begun, the output of the mines being sent in barges down the Kanawha and Ohio rivers to Cincinnati, Louisville and various other river points to the south and west. Kanawha now ranks fifth in the production of coal, its output for 1914 being 5,108,783 tons. Most of its product is carried to the west and southwest by the Chesapeake & Ohio and Kanawha & Michigan railroads, both of which run entirely through the county from east to west, and by the Kanawha river, from whose mouth great fleets of barges pass into the Ohio at various times throughout the year.

It is believed by those who have studied the situation closely that when the system of locks and dams now being built in the Ohio river by the government is completed, making a permanent 9-foot stage in that river throughout its entire length, the amount of Kanawha coal sent to market by water will be largely augmented, and that the various river communities between the mouth of the Great Kanawha and the mouth of the Mississippi will become its purchasers and consumers. It is thought by some, indeed, that boats will be built that will carry coal from Kanawha river tipples to the various ports on the Gulf of Mexico, and even to Atlantic ocean ports. When that type of boats goes into commission, as it undoubtedly will in the course of time, Kanawha county coal lands will come into more active demand than they have ever known. There are still large areas of undeveloped coal lands in the county, and coal mining will be an important industry for many years to come.

Lumber and Salt.

The lands of this section were formerly heavily timbered, and even now there are large wooded areas in which much merchantable timber still stands. There are also a few tracts yet of virgin forest, but these are being rapidly felled to help meet the growing demand for lumber of all kinds. It will, however, be many years before the timber in the county will all be cut and the sound of the saw mill forever stilled.

Early in the last century salt making became an important industry in the Great Kanawha Valley. Strong salt brine was secured by drilling shallow wells along the river bottoms, and this was piped into great kettles where, by the action of heat, the water was evaporated and the salt left to be taken up and barreled ready for use. So great was the demand for this salt that ninety furnaces were in operation along the river above Charleston in 1840. Most of the product was sent down the river in

flat boats to Cincinnati, Louisville and other points as far south as New Orleans, and the returns made the Kanawha Valley one of the richest and most prosperous sections of the country. At first these furnaces were fired with wood, but coal began to be used in 1817 and from that time on formed practically the only fuel, although natural gas, a flow of which was struck in drilling for brine, was piped to one or more furnaces and utilized for a time. This was the first recorded use of natural gas for manufacturing purposes. In the sixties salt making along the Kanawha began to decline, and by 1880 all the furnaces but one had closed down forever. That one still runs, and finds in bromine a by-product that helps largely to make the manufacture of salt profitable. The brine still underlies the surface of the ground up and down the valley, however, and the coming time and changing conditions will probably bring back to Kanawha a share in the industry which once added so much to its prosperity.

Oil and Gas.

Within the past half dozen years Kanawha has become one of the largest oil producing counties in the State. In 1909 oil was struck on the waters of Falling Rock creek in the north-western section of the county, and two years later a very large pool was tapped near the mouth of Blue Creek, which puts into Elk river fourteen miles from its junction with the Kanawha. Some of the wells in this pool flowed thousands of barrels per day for a time, but their force was soon exhausted and those now producing are being pumped. The productive territory has been found to extend for some distance to the east of where the first strike was made, and both south and north, and while no big strikes have been recorded, producing wells are still being brought in, and the approved field is expected to make a good yield for some years to come.

Within the last few months some good wells have been brought in on Cabin Creek, in the southeastern section of the county. Only a few have thus far been drilled in this field, and its extent has not yet been outlined nor its probable value ascertained. Experienced oil men, however, express the opinion that the producing wells thus far drilled in have struck the edge of a big pool, the exact location of which will be determined in the course of time.

Natural gas wells varying in size and value have been struck in numerous places in Kanawha county. A shallow well drilled in 1815 in the search for salt water, inside what are now the limits of the city of Charleston, gave forth a small stream of gas up to thirty years ago. In the middle eighties another well on the bank of Elk river, inside the city limits, was found to be a gasser, and the flow was used for a time to fire the boilers of the city water works. It was finally drowned out by the inflow of water, against which provision had not been made. In the late nineties some large producers were struck in Big Sandy district, the output from which was piped to Charleston. Since that time gas has been found in a number of different sections, until there is now well defined gas territory and considerable production in almost every general division of the county.

The output of these wells is being carried into Charleston, South Charleston, Dunbar, St. Albans, Cedar Grove, Clendenin and other towns throughout the county and there utilized to light and heat the houses of citizens, to fire the furnaces of factories and to generate power for industrial establishments of various kinds. The plentiful supply of gas and the low price at which it can be fur-

nished consumers has been of marked benefit in bringing into Kanawha numerous manufacturing plants of various kinds, to give employment to labor and add to the wealth and commercial importance of the county.

Transportation Facilities.

In the matter of transportation the county is well supplied. The Chesapeake & Ohio, one of the country's great trunk line railways, runs entirely through it from east to west, giving unsurpassed service to the centers of commerce and population in both directions. At its tide-water terminus at Newport News, on Hampton Roads, the Chesapeake & Ohio meets ocean going vessels sailing to every known port, bringing West Virginia into close connection with all the principal parts of the world. The Kanawha & Michigan also runs entirely through the county in a generally east to west direction, carrying straight to the business centers of the Middle West, and the ports of the Great Lakes. The Virginian Railway, while having no track of its own within the county, enters it on the tracks of the Chesapeake & Ohio, and gives its people another excellent route to the eastern seaboard on Hampton Roads. The Coal & Coke, running from Charleston up the valley of the Elk, furnishes a direct route through the central portion of the State, and with its connections reaches northern and eastern points outside the State. The Kanawha & West Virginia railroad runs from Charleston up the Elk valley to the mouth of Blue Creek and thence into the rich coal and timber region in the north-eastern part of the county. The Coal River branch of the Chesapeake & Ohio runs from St. Albans up Coal river, bringing Kanawha into close touch with the rich coal, oil, gas and timber regions of Boone and Lincoln counties. Other short line roads run out from these main lines at various points, all adding to the sum of the county's transportation facilities.

Water and Electric Lines.

Supplementing the railroads is the Kanawha river, locked and dammed from its mouth entirely through Kanawha county, and navigable for loaded barges and heavy draft steamboats throughout the entire year. Numerous packets and many towboats ply its waters, all doing their part in the up-building of the county and its various communities.

From Charleston two electric interurban lines have been built into the outlying districts. One of these crosses the Kanawha at the city's western limits and runs to South Charleston, Spring Hill and St. Albans, a total distance of twelve miles. The country lying along this line is being built up rapidly and it is a question of a short time only when from Charleston to St. Albans there will be a continuous town. The same line is being extended from Charleston up the Kanawha, its objective point being Montgomery, in Fayette county, twenty-six miles east. It is expected that this section will also show a rapid increase in population as a result of the building of the road which will bring it into close touch with the chief city and commercial center of Kanawha county. Another interurban line reaching out from Charleston runs down the Kanawha river six miles to the industrial town of Dunbar. There a town of several hundred inhabitants has sprung up almost overnight, and the country between it and Charleston is being rapidly built into a continuous town. These interurban roads have done a great deal toward building up real estate values and adding to the general wealth of the county.

Building Good Roads.

Kanawha county has just entered upon an era of good-roads building that promises to have a more beneficial effect upon its people generally than any other one thing ever undertaken. The old time plan of working roads by smoothing down the surface a little here and there, of filling a few of the worst mud holes and putting in temporary drains during the summer, only to have the roads become impassable with the return of winter, has been abandoned, and the roads now being built are of brick or some other approved surfacing material laid on cement foundations. Roads of this character are being built in several directions from Charleston, the county seat, the intention being to have them lead from that city all over the county. When this system is completed the country precincts of Kanawha county will be provided with roads equal in all respects to the best city streets. It is anticipated that the building of good roads will result in a great impetus to farming throughout the county, as it will give the agriculturist the easy access to markets and shipping points which has hitherto been lacking.

The members of the county court who planned and are carrying forward the good roads construction have received such universal support from the people that there can be no doubt of the final fruition of their plans into a network of well built roads carrying into every section of the county.

Excellent Public Schools.

The people of Kanawha county have long taken a deep interest in their public schools, and the consequence is an excellent system of instruction for the young. Old school buildings have been and are being replaced with new and modern ones, the most approved courses of study and instruction are being adopted, first-grade teachers are being employed wherever possible, and the schools of the entire county are conducted along the lines best adapted to the object for which the public school system was established—that of giving the youth of the county the educational opportunities best adapted to the needs of the average citizen.

During the year 1914-15 there were in Kanawha county 562 schools. In addition to their graded schools, Charleston and St. Albans have High Schools of more than ordinary excellence, and there is at East Bank a district high school that has a faculty of six and a course of instruction that carries up to the ordinary college curriculum. The schools in the county run from six to nine months. The teachers employed are for the most part college or normal school graduates, and most of them holders of No. 1 certificates.

Cities and Towns.

The principal city in Kanawha county is Charleston, county seat and State capital. It is located at the confluence of the Elk river with the Kanawha, and is a beautiful municipality of about 28,000 population. Located in and about Charleston are a number of manufacturing concerns, the total payrolls of which run far into the thousands of dollars weekly. Numerous wholesale houses are located there, and the traveling men who go out from the city on their commercial pilgrimages number several hundred. It is a strong banking center, and the zone of its retail trade embraces practically the whole of

the Kanawha Valley. It is the place of residence of many of the coal men whose operations lie in the Kanawha and New River fields, and is especially noted for the great number of handsome homes that adorn its residence sections.

St. Albans, lying on the Kanawha river twelve miles below Charleston, at the mouth of Coal river, is an active and enterprising town of some two thousand people. It has long been the location of a large lumber business which has brought it much prosperity. Since the building of the Coal River branch of the Chesapeake & Ohio and the development of the coal business in the Coal river basin, St. Albans has become the place of residence of a number of persons interested directly or indirectly in the coal business and in the operating department of the railroad. The town does a large business with the excellent agricultural country lying close about, of which it is the trade center.

Clendennin, lying on the Elk river and the Coal & Coke railroad twenty-one miles northeast of Charleston, is a wide-awake town of some twelve hundred population. It has enjoyed a great deal of prosperity by reason of the large developments of oil and gas in the country of which it is the commercial center, as well as from the trade which comes to it from the excellent farming section to which it is the gateway. It has two banks and a considerable number of important mercantile establishments.

Cedar Grove is a growing town lying on the north bank of the Kanawha river about twenty miles above Charleston. In 1910 the census gave it 679 inhabitants, and the number has since been increased to something like a thousand. It is the center of large mining operations, and a big glass plant recently located there gives employment to a considerable number of workmen.

Eastbank, with 600 population, lies on the south bank of the Kanawha about nineteen miles above Charleston. Pratt, twenty-one miles above Charleston, at the mouth of Paint creek, has a population of four hundred. Malden, on the north bank of the Kanawha, six miles above Charleston, was once the commercial center of the Kanawha Valley, when salt making was its principal business. It is now the home of a number of families with names well known in the history of that day. Sissonsville, on the Pocataligo river in the northwestern corner of the county, is the center of one of its best agricultural sections. There are numerous other towns and villages in various parts of the county, especially about the big mining operations, the sum of whose populations runs far into the thousands.

County Government.

The government of Kanawha county is in the hands of enterprising and progressive men, who are keenly alive to the interests of the people, and is run in a most thorough, business like manner. The only debts the county owes are bonded ones, and its paper passes current at the value expressed in the figures on its face.

By economies instituted by the county commissioners now in office sufficient money has been saved to pay for building a number of miles of high class road without increasing the county levy, and each year a considerable sum is being devoted to that purpose, in addition to the amounts being raised in a number of districts by the issue of bonds.

Few sections of any State offer so many inducements to those looking for business opportunities, for locations for manufacturing enterprises, for investments or for homes; there are none that offer more.

Logan County.

Logan county was created by an act of the General Assembly of Virginia adopted January 12, 1824, from lands originally comprised in the counties of Giles, Tazewell, Kanawha and Cabell, and was named for Logan, the great Mingo chief who immortalized himself by a famous address which has been handed down from generation to generation through the medium of school text books.

The commissioners named in the act to locate the county seat were William Buffington, of Cabell; William Thompson, Jr., of Tazewell; Charles Hale, of Giles; Samuel Shrewsbury, of Kanawha; Conrad Peters and John Taylor, of Montgomery. This committee selected a site at the confluence of the Guyandot river and Island creek, calling it Lawnsville. Later the name was changed to Aracoma, and again to Logan Court House. Something like two decades ago it underwent another change, only the name "Logan" being retained.

The first house on the present site of Logan was built by John Dingess, one of three brothers who came from Europe to Mercer county. Riley Dingess settled at the mouth of Island creek and Peter Dingess reared his cabin in the wilderness at the mouth of Peach creek, two miles below Logan on the Guyandot river. The fourth settler was James White, who located on the present site of Peck's mill. Garland Conley was the fifth man to brave the wilds and pitch his tent at the mouth of Buffalo. This was considerably more than a century ago, but the exact dates have long since been forgotten.

The original boundaries of Logan were: "Beginning at the junction of White Oak Mountain and New River, proceeding with the meanderings thereof until it reaches the line of Kanawha county; thence with the lines thereof taking the dividing ridge between the Big and Little Cole rivers, until it comes on a line with the head of Rock creek; thence down the same to its mouth; thence crossing Little Cole, proceeding with the dividing ridge between Turtle and Horse creek to the head of Ugly creek; thence down the same to its mouth crossing the Guyandot in a straight line to the mouth of Marrowbone creek; thence up the Tug Fork of Big Sandy river to the mouth of Elkhorn creek; thence proceeding with the dividing ridge between Elkhorn creek and the Tug Fork, and so on a line with the Flat Top Mountains to the beginning."

It will be seen from the above that Logan once comprised a large boundary, but in the course of time other counties were formed, Logan being called upon to donate a share of her original boundary. The last cession of her territory occurred on January 23, 1895, when by an act of the West Virginia Legislature the county of Mingo was created. By this act Logan gave up 523.50 square miles of her territory.

The present area of the county as shown by the topographic sheets of the United States Geological Survey is 455.82 square miles. The surface of Logan is rugged and hilly, varying from 600 feet above sea level at Big Creek to 2,750 feet at the corner of Logan, Boone and Wyoming counties, a difference of 2,150 feet between the two extremes. This difference is due to a gradual rise of both the valleys and the summits. The hills range in height from 500 feet on the Lincoln county line to 1,200 feet or more in the region southeast of the town of Logan.

Population.

The population of Logan county during the past fifteen years, or since 1900, has grown by leaps and bounds. According to the United States Census the Population in 1890 was 6,270. Ten years later it was only 6,955, but in 1910 the census figures show that Logan county had people numbering 14,476. The percentage of increase from 1890 to 1900 was only 10.9 per cent., but from 1900 to 1910 it was 108 per cent. The development of the coal mining industry, made possible by the completion of the Guyan Valley branch of the Chesapeake & Ohio Railway, has been directly responsible for the rapid growth of Logan. This completion did not occur until 1904, so that it is safe to assume that the large increase of population in the period mentioned occurred during the last six years of the census period, or between the years 1904 and 1910. Competent judges declare that the growth in the population of the county in the past five years has been even greater than during the preceding six years, so that it is assumed that the present population numbers between 22,000 and 25,000. The growth of the town of Logan has been almost phenomenal. The population in 1900 was 444. Ten years later, it was 1,640. Today, a careful, conservative estimate places the population at 3,500, while within a radius of five miles there are from 12,000 to 15,000 people. In ten years, from 1900 to 1910, the town of Logan increased its population to almost four for one, and during the past five years the growth has been even greater in proportion, and it is confidently believed that in 1920 the Federal census will give the city at least 6,000 people.

If any evidence were needed of the marvelous growth and development of Logan county in the past few years it would be found in the immense increase of property valuations as shown by the books of the county assessor. Valuations both real and personal indicate that Logan is one of the most prosperous counties of the State, yet the development of the great coal deposits is practically in its infancy.

The following will indicate the continued steady growth during the past four years:

	1911	1912	1913	1914
Real Estate.....	\$ 9,181,360	\$ 9,627,656	\$12,843,521	\$14,938,799
Personal Prop.	1,894,356	2,328,592	2,826,197	3,471,789
Total	\$11,075,716	\$11,956,248	\$15,669,718	\$18,310,588

The increase for 1914 over 1913 was \$2,640,870, while the increase over 1911 is \$7,234,872. The material development of Logan county began with the building of the railroad in 1904. The total value of lands in the county in 1905 was \$3,363,644. It will be seen from these figures that in the ten years from 1905 to 1914, inclusive, real estate valuations increased \$11,475,155. In the four years, 1911-1914, the increase in valuations more than doubled the total land valuation in 1905. There is perhaps no other county in the State which can boast of such a remarkable development in the short period of a single decade.

Products.

The principal animal products of Logan county are hogs, poultry, cattle, horses and mules and dairy products.

The principal vegetable products are timber, corn, Irish potatoes, sweet potatoes, apples, melons and garden

vegetables of all kinds. The river and creek bottoms are specially adapted to the growth of melons and sweet potatoes, while fruit growing could be made a profitable industry. Many varieties of apples and peaches thrive on the hillsides. Corn grows to perfection, even on the steepest lands, only a small amount of labor being required to produce splendid crops. Much of the soil of the county is specially adapted to trucking, and farming of the intensive order could be made to pay well. No section of the country affords a better home market for vegetables and produce of every description. A market can be found among the mining towns and in the county seat at the very highest prices for anything that can be produced. One of the crying needs of the county is a good dairy. Milk sells for 40 cents a gallon, due to its scarcity, and the family owning one or two good cows is considered lucky. The food and dairy products of the county do not begin to supply the local demand.

The principal mineral products of the county are coal and natural gas, both of which will be treated at length further on.

Towns and Villages.

Logan is the only incorporated city in Logan county. The growth of Logan was insignificant from 1827, when the town was first established, to 1904, when the Chesapeake & Ohio Railway was built into it from Barboursville. As noted above, the population in 1900 was only 444. Seven years later the town was incorporated as a city, and in ten years the population had about quadrupled. The natural location is such that Logan will always be the metropolis of the Guyan Valley, since practically all of the coal mined must be assembled on the yards of the railway at this point. The Chesapeake & Ohio Railway maintains extensive shops at Logan for repairs to rolling stock, giving employment to many skilled workmen and mechanics. Logan is the county seat of Logan county. The court house is a handsome structure of native sandstone. A number of wholesale supply houses are located in Logan and supply the surrounding territory, while the retail houses in all lines are far above the average for cities of the same size.

Holden, the second town in importance in the county, is located on the Copperas Mine Fork of Island Creek, four miles West of Logan, and is served by a branch line of the Chesapeake & Ohio. The town has a population of about 3,000. Holden is perhaps the best example of a model coal and lumber town in the entire State. The town is well planned, well built and has many comfortable homes for miners and employes generally, with commodious club houses for unmarried men. A modern artificial water purification system, a theater building and a fine public school add materially to the many advantages of this populous community.

The town of Ethel, located on Dingess Run, $4\frac{1}{2}$ miles northeast of Logan, is another important coal mining town which is reached by a branch line of the Chesapeake & Ohio. The population of Ethel and immediate surrounding territory is estimated at 2,000. Its size and importance is due entirely to the number of mining operations in or near the confines of the town.

The town of Clothier is located on Spruce Fork of Little Coal River, and lies partly in Logan and partly in Boone county. It is served by the Coal River branch of the Chesapeake & Ohio Railway. It is strictly a coal and lumber town and has an estimated population of 1,000. A large power plant, capable of sending 6,600 volts of

alternating current, is located at Clothier and furnishes power for running all the machinery at the various mining operations on the Spruce Fork south of Sharples.

Chapmanville is located on the Guyandot river and the Chesapeake & Ohio Railway, 11 miles northwest of Logan, and is the largest town in the county north of Logan. It is in the center of a large natural gas field. A large plant producing carbon black from gas is located at Chapmanville with a daily capacity of 3,000 pounds.

There are a number of smaller towns in the county, each with a population varying from 70 to 700. They are as follows: Accoville, Amherstdale, Big Creek, Cranoco, Dobra, Henlawson, Hughey, Kitchen, Man, Manbar, Monitor, Seng, Sharples, Sherman, Sovereign, Stollings, Stone Branch and Whitman.

Coal Development.

The Logan district may be regarded as the very newest, and possibly the most progressive, of all of the wonderfully rich coal producing areas of West Virginia. It is to the development of the mining interests in the past ten years that Logan county owes its wonderful progress in material growth, and commercial importance. It is a remarkable fact, but nevertheless true, that while the greater and older coal producing counties of the State in 1914 showed a decline in production, Logan more than kept up her ratio of increase, which has been steadily maintained since the opening of the first mining operations in 1905. Ten years ago Logan stood 20th in order of production among the 33 counties in which coal is mined. Today the county stands fourth; and was the only one of the leading coal producing counties which failed to show a decrease from the 1913 production.

This increase in the Guyan Valley fields may be attributed to several causes—viz: the coal is one of the best combinations of gas and steam coal in all the great West Virginia, Virginia and Kentucky fields; mining conditions are better, the beds thicker, and with better covering than most fields, being above water and therefore more easily mined, as well as making easier and safer the ventilation and drainage; the splendid efficiency of the mining plants, the very best and most modern mining equipment having been installed; the erection of model homes for miners and employes, all of which attract and hold the best mining talent of the country and these are the things that have served to bring Logan county rapidly to the front.

Optimism and enthusiasm prevail among both operators and employes in the Logan field. Pessimism is unknown, and the best of feeling prevails among employers and employes. Labor disputes and troubles have never arisen to retard the work of development in this field, and whatever gloom may or has prevailed over the coal industry elsewhere in this country there is no need for anxiety in the Guyan Valley field.

Growing Production.

Logan is producing more than one-twelfth of all the coal mined in the State, and now stands fourth in rank, having risen from sixth place in 1913. There are now about 60 operations, against 48 in 1913. According to the annual report of the Department of Mines for 1913 there were 2,200 miners employed. Of these 2,110 were machine miners, producing 3,960,667 tons while 90 pick miners produced 158,910 tons. The laborers employed outside and inside the mines in 1913 were 1,406, bringing the total of mine employees up to 3,606. The production of coal for

1914 was one-third more than for the previous year, which would indicate an increase in the operating force of more than 1,200 men, bringing the number of employees both inside and outside up to the 5,000 mark.

The annual production of coal from the opening of the first mines in 1905 down to the present year will serve to indicate the remarkable development of the coal industry in Logan, and is as follows:

1905	127,616 tons
1906	349,288 "
1907	740,697 "
1908	1,215,039 "
1909	1,909,063 "
1910	2,213,372 "
1911	2,663,155 "
1912	3,243,033 "
1913	4,119,577 "
1914	6,011,670 "

It is estimated that the increase in the 1915 production over that of last year will reach more than a million tons.

Coal Measures of Logan.

The coal measures that prevail in Logan belong to the class known as the "Kanawha measures," which are here found in a high degree of purity and in beds of such thickness as to render mining comparatively cheap. This accounts in large measure for the rapid growth of the mining business in the Guyandotte valley. The veins from which most of the product is now being taken are the Chilton, the Cedar Grove and the No. 2 Gas. These are high volatile coals, free burners and of an excellent quality for domestic and steam making purposes. They are much harder than the ordinary bituminous coals, and will stand shipping and exposure to weather much better.

An average analysis of these coals shows as follows:

Moisture	1.22
Volatile matter	34.66
Fixed carbon	58.17
Ash	5.35
Sulphur	1.02
Phosphorus	0.068

Total	100.00
Average B. T. U. Calorimeter	14405.

The coal from the Logan mines goes to western markets for the most part, and there meets a demand that is growing in size as the quality of the output becomes better known.

County's Schools.

There is no better index to the growth and prosperity of any community than the conditions shown by the public school system. In the past decade there has been a remarkable improvement in the public schools of Logan county. This is especially true of Logan District. During the past year \$85,000 was expended in this district alone on new and substantial school buildings, all of which have been modernly fitted up and furnished with the exception of the Logan high school, which is now under construction and will be completed before the beginning of the next school term. The district spent a \$75,000 bond issue last year, which amount was supplemented from the general school levy by \$10,000. The high school building now under construction will cost when completed \$37,000. There will be eight class rooms, a gymnasium, domestic science and manual training departments and a large auditorium. There are now 54 schools in Logan district, 48 of which are white and 6 colored, employing a corps of 97 teachers, about 25 per cent. of whom are normal graduates. The Logan high school was organized four

years ago with a four years' course. The first graduates of the school were granted their diplomas this year. Both the Logan city grammar and high school buildings are substantial brick structures.

The town of Holden has a substantial 11-room frame school building. The enumeration in Logan district has more than doubled in the last seven years. The following figures indicate that the schools have kept pace with the remarkable industrial and commercial development of this section:

Year	Enumeration
1909	2,223
1910	2,567
1911	2,794
1912	3,145
1913	3,491
1914	4,036
1915	4,482

The school term in Logan district is seven months, except in the Logan city and high school where the term is extended to nine months. The salaries paid teachers range from \$40 to \$60 per month, except in the case of principals, who receive a much higher rate of pay.

Last year Chapmanville district laid a special levy for building purposes, and thereby raised a large amount of money which was spent in the erection and equipment of a number of handsome school buildings.

Triadelphia district has just arranged for a \$40,000 bond issue for building purposes, and will erect a handsome high school building in the town of Man.

Natural Gas Fields.

The development of the big gas field near Chapmanville indicates that there is an oil pool somewhere near, and drilling is being prosecuted in a number of places. It is believed by those who have studied the matter that Logan will prove to be one of the great oil bearing districts of the State, and that much larger developments of gas will be made within her borders. With the increasing demand for natural gas in the manufacturing industries, and the numerous calls for factory locations near the point of production of that ideal fuel, Logan county must attract attention as a location for such establishments. Already carbon black is being produced in the Logan field, and it will be followed inevitably by the manufacture of other articles depending directly or indirectly upon natural gas for the success of their production.

The County's Lumber Business.

The hills and valleys of the Guyandotte were formerly heavily timbered, and for many years vast numbers of logs were floated down the river to feed the saw mills located at various points on the Ohio. Since the Chesapeake & Ohio built its line of road into Logan county this has all been changed, and the output of the forests has been sawed near the point of its origin.

The varieties of timber found in Logan are those common to most sections of West Virginia—poplar, the oaks, basswood, chestnut, beech, maple, etc. The poplar and white oak of the Guyandotte valley are noted for their excellence, and have always commanded the highest market prices.

There are considerable timber areas in Logan county still untouched by the axe of the woodman, and the manufacture of lumber is one of its most important industries. A number of large saw mills and many small ones are located at various points and furnish employment at good wages to a large number of workmen.

Marion County.

Marion county, West Virginia, was formed of territory comprising the southern part of Monongalia county and the Northern part of Harrison county, by an act of the General Assembly of Virginia in January, 1842. On March 26 of the same year the act creating the new county was found truly enrolled and was signed by Lieutenant Governor, John M. Gregory. The county was named for General Francis Marion, a famous Revolutionary leader. The first settlement within the confines of Marion county was on Booth's creek in 1772, and James Booth and John Thomas are reputed to have been the first settlers. The real progress of the county dates from the advent of the B. & O. R. R. in 1852. Since then there has been a constant growth of the coal industry of the county.

The area of the county comprises 313.55 square miles. Area by districts: Fairmont, 20.69; Grant, 25.44; Lincoln, 56.63; Mannington, 100.09; Paw Paw, 39.76; Union 31.33; Winfield, 39.61.

The general surface of the county is rolling and some sections hilly and mountainous. The drainage is perfect. The elevation varies from 847.33 feet above sea level to 2,003 feet in the extreme eastern part of the county.

The population according to the last census report is given at 42,794. Conservative estimates of the present day places the population of Marion county at more than 50,000 people. Fairmont district leads, the city of Fairmont under its present charter limits numbering at least 17,000 souls. Mannington district, which includes the City of Mannington, comes next with an estimated population of 10,000. The last census report gives the population of other districts as follows: Grant, including part of Monongah, 4,885; Lincoln, including Farmington, Worthington and part of Monongah, 8,050; Paw Paw, including Fairview and Rivesville, 4,239; Union, including part of the East Side of Fairmont City, 5,171; Winfield, 2,391. Assuming that other sections or districts have kept pace with Fairmont and Mannington districts in growth of population in the past five years, it is possible that within a half decade the population has increased to at least 55,000. The last census report divides the population as to race as follows: white, 41,935; negro, 851; other races 8. The native white population of native parentage numbered 34,332; native white of foreign or mixed parentage, 2,908; foreign born white, 4,695.

The number of dwellings in the county is 8,775; number of families, 9,212. There are 2,333 farms in the county. The land area is approximated at 201,600 acres, of which 173,529 acres are included in the farms. The value of all farm lands (1910) \$6,926,303. Of the 2,333 farms in 1910, 2,016 were operated by the owners; 287 by tenants and 30 by managers.

Cattle raising is quite an industry in the county, and is practically in its infancy, with great possibilities for the future. The number of all cattle, including dairy cows in 1910, 14,407; of dairy cows, 7,096; horses, 5,693; swine, 5,804; sheep 12,921. The value of farm products in 1909, according to census reports, was \$847,320.

The hills of Marion county will grow blue grass to their summits, affording splendid grazing lands for cattle and sheep, while the Monongahela Valley with its tributaries is a fine agricultural and fruit country. With only slight attention an excellent quality of fruits can be produced on as satisfactory and profitable scale as in any section of

the country. Truck farming is an inviting field of operation, the crops certain, and the market available within the confines of the county.

The Fairmont Chamber of Commerce, alive to the situation and realizing the possibilities in agriculture in conjunction with the Agricultural Department at Washington, acting through the West Virginia University, have employed an expert in agricultural work to assist in the development of the agricultural and farming interests generally in Marion county and for the past year he has been in the active discharge of his duties as prescribed by the department, and the interest in farming and farm life has been greatly stimulated during the past year, indicating greater possibilities in the agricultural lines in the future and as a result of which the cities and towns will reap great benefits, by receiving their produce direct from the farms of Marion county. The farmers and gardeners are finding a ready market right at their doors at profitable prices for all their surplus products. Expert farmers and truckers will find in the Monongahela Valley of Marion county many splendid opportunities. Dairying in Marion county affords wonderful opportunities. The Marion county Cow Breeder's Association was recently organized.

The climate is unexcelled; the winters are mild, being in a latitude that escapes the rigorous cold of sections farther north, and the elevation is such that the summers are delightful. The torrid heat of southern climes and less elevated sections to the north is unknown in Marion county.

That Marion county will in the near future have one of the best and most substantial systems of public highways in the State goes without saying. In 1914 \$400,000.00 of road improvement bonds authorized by the county court were sold for 23 miles of road construction in Fairmont Magisterial district, three miles of which go through the city of Fairmont. The remaining twenty miles lead from other points in the district directly into the city. This work is now under way and will be completed during the present year. The following shows the different kinds of roads under construction and what has been accomplished:

Kind	Under Contract	Completed 1914
Warrenite	2.0 miles	2.0 miles.
Tarvia	2.43 miles	0.2 miles.
Concrete	4.00 miles	0.0 miles.
Brick	11.65 miles	5.11 miles.
Re-paving streets of Fairmont	3.27 miles	0.00 miles.
Total	23.35 miles	7.31 miles.

Leaving 16.04 miles to be completed during the present year.

Mannington district, including the town of Mannington, also has adopted a permanent road improvement system and to that end is spending \$300,000.00 in the district. This road improvement work is now under way. Lincoln and Paw Paw districts as well as other sections of the county are considering ways and means for permanent road improvement, and it is confidently predicted that in a short time Marion will be one of the best paved in the country.

In the matter of educational advantages Marion county ranks foremost among the counties of the State and the country at large. The last ten years has witnessed great development in the educational system of the county.

The old time system has been replaced by model schools in every district and municipality of the county. The teaching force has been increased more than 100 per cent. Beautiful, substantial and well equipped buildings are maintained at the public expense. Fairmont, the county seat, has a new \$100,000.00 high school building, modernly equipped, and has just completed a \$125,000 ward school, beside the State has recently awarded the contract for the construction of a new normal school building to cost \$140,000.

The public school system and the State Normal School located in that city have been welded together, forming a cooperative educational system not excelled. One of the ward schools has been transformed into a modern normal training school. People from far and near are locating in Fairmont for the purpose of educating their children. Teachers, men and women, are placed in the Marion county schools on account of their true worth. Twelve States including West Virginia are represented by the present corps of 355 teachers employed. Of this number 224 reside in Marion county; 104 come from other counties of the State, and 27 from other States. Of the teachers employed in the various districts of the county, 138 are graduates of the Fairmont Normal School; 30 are graduates of other normals. There are 14 graduates of the West Virginia University employed and fifteen graduates of other colleges and universities, bringing the total normal and college graduates up to 197. Of the 355 teachers employed, 270 hold first grade certificates; 78, second grade, and 7, third grade. The salary paid to teachers of the first grade is from \$55 to \$60 per month. Second grade teachers earn from \$50.00 to \$52.50 per month.

Coal mining may be regarded as the chief industry of Marion county, and the annual report of the department of mines for the fiscal year ending June 30, 1913 (the latest) indicates that this is the greatest coal producing section in the State, the number of mining operations considered. Marion ranks third in tonnage and is only excelled by McDowell and Fayette counties in that respect. There are eighteen distinct companies operating in this county a total of 36 mines. The Consolidation Coal Company alone operates 18 mines. The total coal production for the year above mentioned was 5,271,441 tons of 2,240 pounds. Of the men employed, 1,609 were machine miners and 888 pick miners, a total of 2,497. These men produced, on an average, more than 2,111 tons of coal each. McDowell county produced in the same period from 105 mines upwards of 14,900,000 tons, but worked 8,358 miners, while Fayette county ranks second in production, having mined a little over 9,000,000 tons from 109 operations with 7,459 miners, with an average production of about 1,200 tons to the miner.

Marion county is without doubt the center of one of the greatest soft coal developments in the United States. The presence of a vast acreage of the Pittsburgh vein of coal has attracted large capital from other States, until today the capital invested in this county aggregates several millions of dollars. Industrial troubles in Europe focused attention on West Virginia, and coal from the mines of Marion county has already filled the bunkers of many ships for England, South America and South African ports, while the opening of the Panama Canal gives us easy access to the great coal markets of the world.

The growth in coal production alone has been a mighty feature in the industrial development of the county, but the abundance of oil and gas has made possible other great

enterprises. The gas is piped into every town of consequence and used for fuel, lighting and manufacturing purposes at exceedingly low rates. In the vicinity of Mannington are many of the best producing oil wells of the country. Millions upon millions of cubic feet of gas have been burned and transported in pipe lines for manufacturing purposes, and after sixteen years the supply of natural gas is apparently inexhaustible.

Ample transportation facilities are afforded almost every section of Marion county for the shipment of her natural resources such as coal and oil. The Baltimore & Ohio Railroad extends in four directions from Fairmont, the county seat, reaching unrivalled fields of the best bituminous coal to be found in the country. In addition to this great system, the Buckhannon & Northern Railroad, just completed, and is now operating one of the finest steam roads in the world, the southern terminal for the present being Fairmont. This new road furnishes a direct and quick service line into Pittsburgh. The advent of this road which is being operated under the direction of the great New York Central and Pennsylvania systems has added new life to the industries of the community, and various industrial developments are preparing to take advantage of the increased transportation facilities afforded by this new artery of trade. The slack water system of the Monongahela river affords additional transportation facilities to the county, the city of Fairmont being situated at the head of navigation on this stream. Barges and boats can be loaded at small expense with cargoes of coal and other products and their cargoes discharged at New Orleans and other Mississippi river points.

The interurban car lines which reach from Fairmont to Clarksburg, Bridgeport, Weston and Glenville on the south; to Mannington and Fairview on the north, bringing Monongalia county and the border of Pennsylvania tributary to this section, are rapidly developing this wonderful section of the State. Hourly schedules are maintained over more than one hundred miles of interurban trackage. The interurban system was established in 1903 and has been one of the most important factors in the development of Marion county.

Marion county ranks third, among the 55 counties in the State, in the production of coal; third in real estate valuations; fourth in amount of railroad taxes paid to county and State; and fifth in personal property valuations. These facts are shown by the latest report issued by the State Auditor. The amount of railroad taxes paid to the county for the fiscal year ending June 30, 1913, was \$97,893.00.

The assessed valuation of real estate in Marion county for 1914 was \$37,071,385; personal property, \$11,862,003; public service tax, \$17,672,783. The real estate and personal property increases respectively over 1912 were \$1,488,430.00 and \$861,563.00.

The county court is composed of A. M. Glover, president; Lee Swisher and Sylvanus L. Shaver, commissioners. All the members of the county court are farmers, and all are more or less interested in the material and industrial development of the county. President Glover is largely interested in the production of oil in the vicinity of Mannington. Mr. Swisher is a director in the Fairmont Trust Company, and Mr. Shaver was formerly deputy assessor for his district. All are men of sterling worth, sound business judgment, and of irreproachable character, and are truly representative of Marion county and the people's best interests.

Mason County.

The county of Mason, with its 432½ square miles of territory, was formed from part of Kanawha in 1804. The Ohio river forms its western boundary for a distance of 56 miles, and the Great Kanawha, flowing through it in a northwesterly direction for 18 miles, divides its territory into two almost equal parts. The county is thus given 92 miles of bottom land of an average width of one mile, making an area of 92 square miles of level land, to which may be added about ten square miles embraced in two small plains known respectively as Pleasant Flats and Dutch Flats, and a number of other square miles embraced in bottom lands in various creek valleys, making the total area of level land within the county about 100,000 acres. In addition to this area, practically every acre of which is available for cultivation, there is a great deal of smooth land on the sides and tops of the low-lying hills that is easily cultivatable. More than half the total area of the county is now under cultivation, and practically all of it will be cultivated or put to grass when the timber is all cut and the demand for farm products calls for it. The soil in the bottoms is a very deep rich loam; that on the hills is made up of clay, clay loams, and calcareous loams intermingled with the red sediment of the Conemaugh series. In 1904 the total valuation of property in the county for purposes of taxation was \$5,047,356.29. In 1914 it was \$8,826,920, an advance of \$3,779,564 in ten years.

Farming forms a large proportion of the industry of the county, and has brought to it most of the prosperity which it has enjoyed. In 1910 there were 2,194 farms, as against 1,983 in 1900. Of these more than four-fifths were operated by their owners, as against seventy per cent. so operated in 1900. The products consist for the most part of corn, wheat, hay, apples, peaches, Irish potatoes and oats, in the order named. The value of the crops is more than a half-million dollars a year. To this may be added dairy products of \$150,000; wool, \$15,000; poultry products, \$100,000 and the products of bees, \$7,000. The county has long had high standing in the matter of production of high grade livestock—blooded horses, cattle, sheep and hogs, the value of which is probably three quarters of a million dollars. It is, in fact, one of the best grazing counties in the State. Blue grass is indigenous to its upland soils, and clover, timothy, red-top, alfalfa and other tame hay and forage grasses produce luxuriantly in the bottoms.

Mason County has for many years enjoyed distinction throughout a wide region for the fine melons grown on its bottom farms, and the Mason county watermelon is the standard for excellence wherever known. These melons are shipped to many markets and always bring the highest price. The rich loam of the bottoms is also ideal for the production of many other truck crops, and the county throughout offers attractive inducements for market gardening and the production of all kinds of vegetables.

Being within easy reach of some of the country's best markets, there is every reason why the business of trucking, prosecuted with intelligence and industry, should be made to yield a profit.

Almost the entire area of the county is underlaid with coal, among others the famous Pittsburg seam, and mining operations have been carried on there ever since 1847. There are now a number of operations of moderate size, the output being something like 125,000 tons per annum. The coal is there, however, in seams of workable thickness, and there is liable to be a revival of mining operations at any time.

A handsome gray sand stone cropping from the hills in many places has been found to be excellent for building purposes. It has been extensively used also in bridge piers and in the government work on the Ohio river, where it is found to resist the action of the water to a very great degree. There is an excellent quality of brick clay along the Ohio river at Spilman, where the manufacture of brick and tile has been extensively carried on. A large bed of fire clay is known to exist at Mason City, but has not yet been worked.

Forty years ago there was an important salt manufacturing interest in the county, ten furnaces being operated at the time and having a large output. This industry almost entirely disappeared until recently when, on account of the value of the by-products, it was revived and now promises to resume something at least of its old time importance.

There are now operating in the county more than fifty manufacturing concerns of greater or less size, the aggregate business of which is large and of large importance. The payrolls of these establishments are the means of distributing large sums of money among the people each month, and of adding something to the prosperity of every class of the county's citizenship. With coal lying under practically every acre of its area, and with natural gas from other counties brought in by means of pipe lines, Mason county offers at various places opportunities and advantages for the establishment of manufacturing industries equalled by those of few communities, surpassed by none.

The transportation facilities of Mason county are all that could be desired. The Baltimore & Ohio railroad traverses the entire western border, running with the meanderings of the Ohio river from Jackson county on the northeast to Cabell on the southwest, a distance of 56 miles, while the Kanawha & Michigan follows the course of the Great Kanawha from the Putnam county line on the east to the Ohio river on the west. These two roads with their connecting lines give Mason county products easy access to all the country's markets. The Kanawha river, the most perfectly improved stream in the country, flows through the county from the southeast, and the Ohio, bordering the county's length from northeast to southwest, complete facilities of transportation not easily duplicated.

The public school system of the county is equal to that of any other in the State. There are 181 school houses in which the best available teaching talent is employed to take the children of scholastic age through the most approved course of study. The school term runs from five to nine months and the average attendance is high.

Point Pleasant, lying at the mouth of the Kanawha river, is the county seat and principal town. It has a population of some 2300, with strong banks, well established mercantile establishments and a number of prosperous manufacturing plants.

Other towns in Mason county are Leon, on the Great Kanawha, and Spilman, West Columbia, Clifton, Mason, City, Hartford City, New Haven and Letart, on the Ohio.

All these towns have excellent sites for manufacturing plants of various kinds, plenty of cheap fuel is available to all, and there is both railroad and water transportation for the assembling of raw materials and the distribution of finished products.

McDowell County.

McDowell county was formed by an act of the legislature of Virginia on February 20, 1858, from territory originally included in Tazewell county. This act provided that a commission composed of George W. Payne, Samuel Lambert, Thomas Perry, Elias V. Harman and Henry T. Perry be named to lay off the county into magisterial districts, four in number. The commission named to select a site for the court house and other public buildings failed to act. On June 11, 1861, James R. Duke, J. C. Harman and John Harrison, who had been later named as a committee, filed a report of the laying off of the square for the court house and other public buildings, and on October 12, the same year, the county court let to George W. Payne a contract to erect same. When the county was first formed, the residence of George W. Payne, on the Dry Fork of Tug river, was designated as the county seat. The records show that court was held on this site from 1858 to October, 1863. Considerable trouble was experienced in securing or of permanently fixing a site, and the "Restored Government," at Wheeling on February 11, 1862, named five commissioners to investigate and recommend a location. The records show that terms of

The surface of McDowell county is rugged and hilly, with a varying elevation of from 1,200 to about 2,750 feet. Here, as throughout all of this immediate section of the State, numerous streams abound, all of which flow into the Tug Fork of Big Sandy river. The county comprises a total area of 369,850 acres, of which 22,528 is classed as mineral or timber land.

County's Rapid Growth.

McDowell is one of the most densely populated of the West Virginia counties. From one end to the other are prosperous towns and coal mining camps. The population is composed of white Americans, negroes, and a foreign element, largely Italian and Hungarian, and is variously estimated at from 55,000 to 60,000.

For many years past, McDowell has shown a continuous steady growth in property valuations, until today she ranks high up in the list of wealthy counties, although without a single large city with its attendant increased realty valuations. In 1914, McDowell raised in taxes for all purposes, \$279,507.82.

For many years past the growth in material wealth has been steady. The total realty valuations as shown by the land books of the county for the year 1913 is \$28,098,012. The total valuations of 1913 amounted to \$28,228,054, a material advance over the previous year. The total personal property valuations in 1914 were \$6,555,320, bringing the total property valuations up to \$34,784,274. For the past three or four years there has been an annual increase in personal property valuations of about a quarter of a million dollars.

Largest Producer of Coal.

Of the 33 coal producing counties of the State, McDowell county takes the lead by several millions of tons annually, although operating a smaller number of mines than some other counties. McDowell leads in coke production, its output being more than double that of any other county in the State. According to the report of the Department of Mines, during the year 1913, the coke produced amounted to 984,312 tons. The total coal mined for the same period was 14,913,342 tons. Of this amount, 8,204,038 tons were mined by pick miners, while 6,709,304 tons were machine mined. This is one of only three or four counties in the State employing a greater number of pick than machine miners. According to the mine report for the fiscal year ending June 30, 1913, the entire coal production of the State amounted to 61,770,352 tons. It will be seen that McDowell produced nearly one-fourth as much as the entire State, which is a remarkable showing for a single county, and clearly indicates the wonderful development of the mining industry in the county. There are about 100 mines in operation.

History of Mining.

The first commercial coal was mined in McDowell county in 1839. In that year the production amounted to 245,760 tons. There has been a steady and continuous growth, year after year, until the enormous production of 1913 as noted above. There was still an appreciable increase for 1914, but the figures are not available. McDowell exceeded the production of the next ranking county (Fayette) by over 5,800,000 tons, although more mines were operated in the latter county. McDowell has



McDowell County Court House and Children's Playgrounds, Welch, W. Va.

the court were held at the home of Rebecca Brewster, and on May 8, 1866, Judge Nathaniel Harrison, issued an order that the circuit court be held at the residence of James Harris, and the clerk's and recorder's offices were kept at the home of H. T. Peery. Sometime during the civil war, the court records were removed to Tug river from Dry Fork. The "Restored Government" commissioners, in October, 1866, located the county seat on a farm near the mouth of Mill Creek, where it remained until moved to Peeryville in 1874. For many years there was trouble over the final selection of a site. Various acts of the Legislature were passed, but were not enforced. Finally an election was ordered and after a bitter contest in the courts and the Legislature, the town of Welch became the county seat, and county records were removed to that place in 1892. One or more elections were held in a futile attempt to locate the court house at Iaeger. At Welch the court house was located in an old building which has since been destroyed by fire. In 1895 the present court house was accepted, and in 1910 the annex was completed, and today the imposing stone structure is regarded as one of the finest court houses in the State.

The county now comprises six magisterial districts, as follows: Adkin, Brown's Creek, Elkhorn, Northfork, Big Creek, and Sandy River.

led all other countries since the year 1905, and bids fair to continue in the lead for many years to come. The increased production of 1913 over 1912 was 1,145,265 tons, while the next largest increase was 268,000 tons below that of McDowell.

The total number of persons employed in mining operations in the county, according to the authority quoted above for the year 1913: 16,496. Of these 12,657 were engaged in work on the inside of the mines. The employees were divided as follows according to nationality:

White Americans.....	5,315
Negroes	5,732
Hungarians	2,031
Italians	1,723
Russian	394
Slavish	386
Polish	305

Other foreign born miners were employed, but in the aggregate amounted to only a few hundred. The mines of this county are remarkably free from labor troubles and other disturbing elements. The most cordial relations exist in the main between operators, officials, and miners. But few fatal accidents have occurred in the past in these mines. The class of homes in the various mining camps are far above the average, and in some instances, better than are to be found elsewhere in the Norfolk & Western fields.

County's Coal Measures.

Almost every acre of McDowell county is underlaid with the famous Pocahontas coal, than which there is none better. Low in ash and volatile matter, and high in fixed carbon, with moisture but a fraction of one per cent. and both sulphur and phosphorus mere traces, this coal is the standard for excellence wherever known. The United States naval authorities, after hundreds of tests, gave it the stamp of their approval for marine steaming purposes, and it is now largely used in the war vessels of the nation. This coal has the typical structure for coking purposes, its only fault being its high degree of purity, to overcome which it is frequently mixed in coking with coals of greater ash and volatile contents. Formerly there was a great deal of coke manufactured in the Pocahontas field, but recently many ovens have been abandoned and the coal is taken in its natural state to where by-product ovens are available and the fuel gases, ammonia, coal tar and other valuable by-products may be saved. The coal from the principal seam in the Pocahontas group, and the one from which most of McDowell county's great production comes, shows the following average analysis:

Moisture	0.68
Volatile matter	14.29
Fixed Carbon.....	80.55
Ash	4.48
Sulphur	0.062
Phosphorus	0.0055
Total	100.00
B. T. U. Calorimeter	15,095.

The coke made from this coal furnishes the following average analysis:

Moisture	0.09
Volatile matter.....	0.98
Fixed Carbon.....	90.00
Ash	7.94
Sulphur	0.58
Phosphorus	0.0061

Mining conditions in McDowell county are excellent, and some of the most modern and best equipped plants in the country are in operation there. With the increase in the demand for marine coals that will come with the use of the Panama canal, mining in McDowell county will receive a new impulse that will carry its output far beyond the highest point yet attained.

County's Educational System.

If there is any one thing more than another of which McDowell county can justly boast, it is its system of education. Within recent years it is safe to say that nearly a million dollars has been spent on the public schools. Hundreds of thousands of this money was spent during the scholastic year 1913-14, thus bringing the county prominently to the forefront in educational affairs. New school buildings have been reared in every section of the county at an enormous expense, in which have been installed the most modern systems of heating, sanitary drinking fountains, toilets, furniture, equipment, etc. Especial attention has been given the matter of ventilation and light.

Five classified high schools for white, and two for colored children have been established. In several instances high schools have been established in connection with graded schools, and school wagons are run to transport pupils to and from the various high school buildings. A high standard of efficiency and morality has been established among the teachers, which in a large measure is accounted for by the high salaries paid to teachers, as compared with other counties of the State. Now that the county is well supplied with splendid school buildings and equipment, the attention of school officials is being turned to beautifying the grounds. All school properties are being graded, fenced, and sodded and planted with shrubbery and trees.

A library has been established in practically every school of the county, until today there are hundreds of them, filled with a choice selection of books. During the school term social center meetings are held at nearly every school, the purpose being to enlist the sympathy of the public in education and all those things which make life happier and sweeter. The compulsory school law is being successfully enforced.

Development.

The educational development has been remarkable in the past three or four years. The first high school was established four years ago. Now there are seven, two of which have been established for the benefit of the colored children of the county. The same graded system prevails in all the schools. The school term is from six to nine months, giving to the children of this mining section all the educational advantages to be obtained anywhere. The school enumeration for the 1914-15 term was 13,533, of which 10,172 were white and 3,361 colored. A total of 280 teachers are employed, a large percentage of whom are college and normal graduates. Teachers are paid higher salaries than in any other county of the State, with the possible exception of teachers in the larger cities. Salaries range in districts as follows:

Elkhorn district: First Grade, \$65; Second Grade, \$55; Third Grade, \$45. Principals are paid from \$75 to \$100. It is a noticeable fact that only one teacher each of the second and third grades was employed in this district last year.

Northfork District: First Grade, \$60; Second Grade,

\$50; Third Grade, \$40. Principals receive \$100. No third grade and but few second grade teachers are employed in this district.

Brown's Creek District: First Grade, \$65; Second Grade, \$55; Third Grade, \$30; Principals, \$80 to \$125. No teachers of the third grade are employed. About three-fourths of the teachers employed in this district are of the first grade.

Big Creek District: First Grade, \$60; Second Grade, \$50; Third Grade, \$40; Principals, \$100. No third grade teachers are employed.

Sandy River District: First Grade, \$65; Second Grade, \$60; Third Grade, \$55; Principals, \$80.

Adkin District: First Grade, \$70; Second Grade, \$60; Third Grade, \$45; Principals, \$100. It is notable that a majority of teachers employed in this district are of the first grade.

Numerous Towns.

There are many important towns in McDowell county, and much business is transacted of a commercial nature. These towns are thrifty and the people are enterprising.

Welch is the county seat and is located on the main line of the Norfolk & Western Railroad at the junction of the Tug Fork branch, of that railroad with the main line. It has a population of between 2,000 and 2,500. It is an important commercial and banking center of the county, easily accessible, with numerous trains daily passing in each direction over the main line, and the Tug Fork branch.

Keystone is an important commercial center and is located on the main line of the Norfolk & Western. There are many large stores and several banks in Keystone.

Northfork is situated at the junction of the main line and the Northfork-Crumpler branch of the Norfolk & Western. This is a large trading and business center, supplying a large population with merchandise and banking facilities. There are several manufacturing enterprises located at Northfork.

Laeger is a thriving town in the western end of the county, and is situated at the junction of the Laeger, Coalwood and Premier branch with the main line of the Norfolk & Western.

Gary is situated on the Tug Fork branch of the Norfolk & Western seven miles from Welch, and at the junction of a short line running to Filbert. This is the headquarters in the Flat Top fields for the United States Steel and Coke Company, and is a model town in every respect, noted for the splendid homes furnished to miners. There is much business transacted in Gary.

There are other towns of more or less importance, among them being: Mayberry, Lick Branch, Ennis, Elkhorn, Powhatan, Kyle, Eckman, Landgraf, Vivian, Olmstead, Hemphill, Davy, Twin Branch, Marytown, Claren, Roderfield, Wilmore, Panther, Wilcoe, Ream, Elbert, Filbert, Thorpe, Black Wolf, Pageton, Jeannette, O'Toole, Jenkinsjones, Anawalt, Leckie, Premier, Coalwood, Algoma, Gilliam, Rolfe, Arlington, McDowell, Ashland and Crumpler.

Transportation Facilities.

McDowell county is traversed from one end to the other by the Norfolk & Western Railway, main line, and numerous branch lines extend up the creeks and hollows to immense coal deposits, and to numerous mining towns.

Facilities for the transportation of both passengers and freight are ample for every need.

Farming in McDowell.

The soil of McDowell county is to a large extent a fertile, sandy loam, fit to produce any kind of crop to which it may be planted. The hillsides produce abundantly of corn, potatoes, vegetables, and garden truck, but it is only recently that any particular attention has been paid to agricultural pursuits. Grass grows luxuriantly on the hillsides and grazing could be made to pay. Fruit culture is rapidly coming to the front, and the very finest apples, peaches, pears, plums and cherries are being produced on a small scale, all indicating great possibilities along horticultural lines.

McDowell county was once heavily timbered, and the manufacture of lumber has been largely carried on in numerous places. There are yet heavily wooded areas in the county, and saw mills stationed at many places do their part in giving employment to labor at lucrative wages. The timber consists of poplar, the oaks, chestnut, hickory and the other varieties that have made West Virginia famous in the lumber markets of the world.

Excellent Roads.

McDowell has set a pace for all the other mountain counties of the State in road building. Experts declare the county has the best system of dirt roads in the country, proving beyond all doubt that any county, however mountainous, can have good roads with a reasonable expenditure of money and effort on the part of the people. McDowell now has a system of roads traversable by motor cars at least ten months in the year, and they have been built without the issue of bonds. Upwards of 90 miles of permanent roadway has been constructed, and some 400 miles of roadway treated, at an average cost of \$900 per mile. Sandy River district recently voted bonds amounting to \$165,000 and regretted that under the statute a greater amount could not be voted. This money is yet to be spent.

Road building has been going on for five years, the work being accomplished through district levies and with prison labor. In many places new roads had to be constructed through cliffs and solid stone for hundreds of yards, yet the highest cost of construction to the people has been but \$15,000 per mile, while most of the new roads were made at an average cost of from \$2,000 to \$3,000.

The splendid sentiment favorable to good roads has been engendered through the activity of the president and members of the county court who may be regarded as a good road's pioneer in McDowell county. Mr. James E. Jones, one of the present commissioners, who has been extremely active along this line, is a prominent coal operator, and when funds were not available he has been known to construct several miles of good roads at private expense. In this way he helped teach the people the advantages of good roads and now nine-tenths of the voters of the county are advocates of improved highways.

McDowell offers many inducements to the manufacturer, the miner, the investor, the lumberman, the farmer, the truck grower, the stockman, and the man of general business. There are many opportunities for investment and the continued growth of the county is a guarantee that great profit will rapidly accrue to those who put their money in McDowell county property.

Wetzel County.

The county of Wetzel was formed in 1846 of territory taken from Tyler county, and was named in honor of Lewis Wetzel, an early settler and well known pioneer. At its northeastern corner it impinges on the State of Pennsylvania, and it is bounded on the west for some distance by the Ohio river. Its area is 440 square miles. Its population was 22,880 in 1900 and had increased to 23,855 in 1910. The county lies wholly within the Ohio Valley division of the State, and a large proportion of its surface consists of smooth, level land, with soils that range from a very deep, rich loam to sands and clays of various degrees of fertility.

Of the 228,480 acres lying within the county lines of Wetzel 190,497 acres are embraced in the 2,133 farms in the county, of which 122,299 acres are improved. The value of farm property in 1910, the latest date for which figures are available, was \$7,082,719, of which amount \$4,659,441 represented the value of the land, making the average value per acre, \$24.46. In the production of corn Wetzel ranks generally about ninth among the counties of the State, with a yield that runs usually well over half a million bushels. In wheat its standing is about eleventh, and its yield about one hundred thousand bushels. In oats its standing is about seventh and its yield something in excess of sixty thousand bushels. The production of the county in potatoes runs well over one hundred thousand bushels a year, the yield being considerably in excess of one hundred bushels per acre. There is a considerable orchard area in the county, and the production of apples averages quite large, though the attention given to fruit growing is not commensurate with the importance of the industry or the possibilities of the county.

The bottom lands, with their loam and sandy loam soils, present many advantages for truck growing, and these are supplemented by facilities for marketing that should make the county attractive to those who seek profit from agricultural pursuits. Of recent years some attention has been given this branch of husbandry, but the area devoted to the production of fruits and vegetables is by no means such as is justified by the potentiality of the soil or the demands of the markets, and opportunity for large profits awaits the man who enters the business and prosecutes it with energy and intelligence.

The entire area of Wetzel county was formerly heavily wooded, and many millions of feet of lumber have been taken from its forests. The varieties of timber that formerly abounded embraced poplar, the oaks, pine, walnut, locust, beech, hickory, hard maple and others indigenous to the latitude, and much of it was of a very fine quality. There is still standing a large quantity of merchantable timber and the manufacture of lumber continues to be an industry of considerable importance.

For a number of years Wetzel county has been one of the State's important producers of oil and gas, and the money received from royalties has made many of its landowners rich and prosperous. While there is comparatively little new development work going on in the oil fields at the present time, the production of oil and gas is still an important item in the schedule of the county's industries. Gas from a number of big wells is being piped into other States, where it enters into the manufacturing industries that are annually enriching them.

The Ohio River branch of the Baltimore & Ohio Railroad runs with the meanderings of the Ohio along the entire

river front of Wetzel, furnishing a direct line to the country's centers of business and population north, south, east and west. Another branch line of the Baltimore & Ohio runs from the Ohio river at New Martinsville, the county seat of Wetzel, through the county in a south-easterly direction and connects with the main line at Clarksburg. Another line of road connects New Martinsville with Middlebourne, the county seat of Tyler county. An electric traction line runs from New Martinsville down the Ohio to Sistersville and other towns and villages in that section. The Ohio river furnishes water transportation during most of the year, and will, with the completion of the system of locking and damming now being carried on by the general government, furnish such transportation throughout the entire year. Thus Wetzel county is possessed of transportation facilities that are ample for the accommodation of a vast amount of business, making it one of the most accessible sections of the entire State.

There are throughout the county numerous eligible sites for manufacturing plants of various kinds, where fuel gas may be secured at extremely low prices, where raw materials may be assembled at low cost, and where transportation facilities are at hand for distributing manufactured products among all the great consuming centers. The coal fields of the Fairmont section are close at hand also, and fuel in inexhaustible quantity is available to take the place of gas when the supply of that fluid has given out.

There are numerous prosperous towns in Wetzel county, many of which have peculiar attractions as places of residence and business. First among these in point of size and commercial importance is New Martinsville, the county seat. This town has 2,176 population, according to the census of 1910. It had 1,059 in 1900 and 692 in 1890, and according to the same ratio of growth enjoyed between those census periods, of which there has probably been no diminution, it now has well over twenty-five hundred. New Martinsville has three prosperous banks and a number of very strong business institutions. It has numerous handsome buildings, chief among them being the commodious court house, built along attractive architectural lines, and well equipped throughout for the purpose for which it was constructed. The town is well paved, has good schools, numerous churches and a large number of beautiful homes.

Smithfield is a town of 765 to which it has grown from almost nothing since 1900. Littleton had a population of 712 in 1910 and but 509 in 1900. Hundred had 557 in 1910 and but 261 in 1900. Pine Grove had 474 in 1910, and was given no rating by the census of 1900. Brooklyn, adjoining New Martinsville, had a population of 627 in 1910.

There are excellent schools throughout all the districts of Wetzel county, and many school houses of much more than average size, well equipped for the proper housing of pupils. The teachers employed are for the most part college and normal school graduates and holders of high grade certificates.

The present members of the commissioners court are enterprising and progressive citizens, who have the welfare of the county close at heart, and who administer its fiscal and financial affairs in a thoroughly business like manner. The county has a large mileage of good roads, steel bridges span the most important streams, and public improvements are constantly being made to keep Wetzel abreast of the most progressive counties in West Virginia.

Charleston.

Charleston, capital of West Virginia, seat of justice of Kanawha county, and commercial metropolis of a vast expanse of rich and prosperous territory, lies on the Great Kanawha river, at the mouth of the Elk, southwest from the center of the State, and half a hundred miles from its western boundary line. It is a city of some thirty-three thousand people, according to the careful estimates of those most competent to judge, and its aggregate wealth, as expressed in bank resources and the figures of the tax assessor, is far beyond that of the average American city of equal population. Its situation, in the midst of one of the world's greatest coal producing areas, makes it a wholesale and distributing point of almost unequalled opportunity, while advantages of fuel, raw material, transportation and banking facilities have given it far-flung fame as an eligible location for manufacturing enterprises of many kinds.

Charleston is the center of a very large natural gas field, the product from much of which is brought to the city where it is sold at prices that make it particularly attractive as a fuel for manufacturing purposes. The gas found in these surrounding fields is in the deep sands, which assures the longevity of the wells, and is a guarantee that the supply will last for many years to come. Some of this gas producing territory is controlled by men who have the up-building of Charleston at heart, and who will not allow the wells to be rapidly exhausted by piping their output to other localities.

Fortifying Charleston's position in the matter of gas for fuel is the fact that coal produced in the closely surrounding fields is of the kind classed as high-volatile, yielding a large percentage of very rich gas, which will unquestionably come into general use in manufacturing plants when the supply of natural gas has been exhausted. For such plants as use coal in their furnaces Charleston has a supply of fuel whose exhaustion lies so far in the future as to render its consideration unnecessary in the equation of the present. This coal is of a very high quality for steam-making purposes, and can be delivered at the factory door in Charleston for prices ranging as low as 75 cents a ton.

In the matter of transportation the city is well provided. The Chesapeake & Ohio Railway, one of the great trunk lines of the country, passes through on its way from the eastern seaboard to the wide reaches of the Middle West, giving easy access to all the country's great centers of population and commerce, and carrying direct to shipside those products intended for foreign markets. The Kanawha & Michigan Railroad runs through the city in its course from the coal fields of the Great Kanawha to the Ohio river, and through its connections to Great Lake ports and the consuming communities of the mighty West. The Virginian Railway, using for a short distance eastward the tracks of the Chesapeake & Ohio, gives another direct line to shipside on Hampton Roads. The Coal & Coke from its southern terminus in the city, runs northeast through the center of the State, and with its connections gives close touch with points north, east and west. The Kanawha & West Virginia Railroad, beginning in the limits of the city, runs northeastward into a section rich in coal and oil and gas and timber, and with an ever increasing agricultural development. The Great Kanawha river, navigable the year round, furnishes water transportation to all that wide expanse of territory bordering

the Ohio river, the Mississippi and its navigable tributaries, and through the Gulf of Mexico to all known ports on, every charted sea.

Charleston is well situated with respect to a number of kinds of raw material used in the manufacture of various articles of general use. It is surrounded by a richly wooded area, the timber from which is of the highest quality. It consists for the most part of poplar, the oaks, hemlock, chestnut, hickory, maple, beech, with some walnut and considerable cherry. Much of this timber now comes to Charleston to be manufactured, but there is room yet for other plants that work lumber into its various finished forms. Glass sands of excellent quality lie close at hand, and a number of large plants are employed in making glass of various kinds. A fair grade of iron ore is found within easy reach of the city, and iron making is among the industries that should find it a profitable place for operations. Clays for terra cotta ware, fire brick and high grade building brick abound on all sides and while not utilized to a considerable extent must in the nature of things be much more largely used in plants located in or near the city. Bauxite, kaolin barytes, and other minerals forming the basis of large manufacturing industries elsewhere are found in such convenient reach of Charleston that it is only a question of time when they will be largely utilized in plants established there. The low cost of bringing raw materials and fuel together at Charleston, and of distributing the manufactured products among the world's best markets, makes it the ideal location for manufacturing enterprises far too numerous to be catalogued here.

The manufacturing plants already in operation in the city include foundries, engine works, boiler works, including the makers of marine boilers; steel plants, glass plants making window glass, bottles, lamp chimneys, photograph plates; an enamel ware factory, mine car works, and works that manufacture tipples, chutes, screens, fans and the other necessary appliances for coal mines; chemical works, cigar factories, saw mills, planing mills and mills making all kinds of office fixtures and interior trim; flouring and feed mills, knitting mills, overall factory, shops making electrical appliances of many kinds; candy and ice cream factories, paint factory, furniture factory, brick plants, concrete block plants, ice factories, tool factories, scythe factory, and the largest axe factory in the world.

The business men of the city, through the Chamber of Commerce, offer special inducements to meritorious manufacturing enterprises including free sites. Natural gas can be secured on long time contracts at low prices by concerns using that kind of fuel.

Charleston is one of the old towns of the State, the first settlement having been made there prior to 1788, and it has long held a position of prominence in the life of the Commonwealth, but it is of recent years only that the growth in population and business has been of such proportions as to attract the attention of the country at large. In 1900 the population as shown by the census was 11,099; in 1910 it was 23,996, and in 1915 it was, as stated above, in the neighborhood of thirty-three thousand. In general business, and especially in manufacturing, its growth has been even greater, though accurate figures showing the increase during the same period are not available. Much, however, may be gathered from the rapid increase in post

office receipts, considered always an excellent index to the business of a city. The receipts of the Charleston post office of \$93,720 for the fiscal year ending June 30, 1909, increased to \$103,517 for the year 1910, to \$116,663 for 1911, to \$141,366 for 1912, to \$150,068 for 1913, to \$170,587 for 1914 and to \$185,147 for the year ending June 30, 1915.

The resources of the Charleston banks have grown from \$12,411,743 in September, 1912, to \$16,137,646 in March, 1915. The bank clearings for 1914 were \$140,453,464, and for the first six months of 1915 they were \$65,397,380. Banking is done on as liberal a scale as is consistent with safety, and worthy business enterprises have no trouble to get the financial accommodations to which the nature and extent of their transactions entitle them.

Charleston is surrounded by excellent farming lands, the wide bottoms of the Great Kanawha, the Elk and other streams, and the sloping hillsides with which they are edged being covered with a naturally rich and productive soil that yields readily and profitably to cultivation. During the past few years greater attention has been given to scientific agriculture than was formerly the case, and the consequence is an increasing yield and growing prosperity for the farmer, a prosperity in which the city shares. The Kanawha County Farm Bureau, an organization maintained by the Charleston Chamber of Commerce, is doing good work in the matter of encouraging more farming and better farming, with the view to bettering living conditions in the city as well as increasing the prosperity of the country. Special attention is given to the encouragement of market gardening, and the effect is felt in a lower level of living cost than prevailed previously.

Two electric traction companies give Charleston street car service commensurate with her needs. One of these has lines reaching all sections of the city and giving quick and reliable service to each. It has a suburban extension also that reaches to the town of St. Albans, twelve miles down the Kanawha river, passing through the towns of South Charleston and Spring Hill and a stretch of country that is being rapidly divided into small farms and residence locations, so that it is but a matter of a little time when the entire distance will be practically a suburban community. The same company is now engaged in building a line up the Kanawha from Charleston to Montgomery, a distance of 26 miles. This line will pass through a number of towns and villages and a section of country already thickly settled, bringing Charleston into still closer relation with a region of which it has long been the chief banking and commercial center. A second electric car line extends from the business district of Charleston down the Kanawha river six miles to Dunbar, an industrial town that has been built during the past three years, and in which there are now in operation a number of important manufacturing plants. This line also brings Charleston into closer touch with an important trade district, and has been the cause of a very considerable suburban development between the two points it was designed to serve.

A movement recently inaugurated by the county commissioners looking to providing the county with good roads will, when carried to its conclusion, bring Charleston into close touch with all the surrounding sections. Smooth surface roads are being constructed in all directions from the city, and soon it will be possible to go from Charleston to any corner of Kanawha county on a highway equal to the best city street.

The municipal affairs of Charleston have been carried on for a number of years under the commission form of government, but recently the responsibility has been still further concentrated and the administration of affairs now dwells largely in the hands of a City Manager. The charter under which the city is now being conducted has been in effect but a few months, but its practical working up to the present time has proven satisfactory, and municipal business moves along smoothly and economically under its provisions.

An extensive scheme of street improvement is now being carried out in which \$465,000 recently raised by the sale of bonds is being expended. This will add several miles of well paved streets to the 33 miles already in operation.

There is an excellent sewer system, consisting of 33 miles of public sewers and 12 miles of private sewers, to which considerable extensions are being made. With the expenditure of the funds now in hand for street and sewer extensions Charleston will become one of the best paved and best sewered cities of its class in the country.

The public school system of Charleston is equalled by that of a few cities in the country, and surpassed by none outside the larger municipalities. It embraces twenty buildings, with a magnificent new High School building in course of construction. These buildings, a number of which are modern in construction and appointment, are equipped with all necessary appliances for thorough instruction. A diploma from the High School carries its holder to matriculation in the high class colleges of the country without special examination.

The streets of the city are well lighted by electricity, the "white-way" plan having been adopted for the chief business sections, and electric current for domestic lighting, for manufacturing and other purposes is furnished at unusually low rates. The cost of gas for domestic purposes is 15 cents per thousand feet.

The water supply is ample, the service good and the water, pumped from the Elk river and thoroughly filtered before being sent through the mains, is of excellent quality.

The city has a telephone system that embraces more than four thousand subscribers, with long distance connections that ramify the entire country.

There are five first class hotels and a number of smaller ones with guest capacity of 1,500.

Four thoroughly equipped hospitals are maintained for the benefit of those who suffer bodily ailments, and several institutions for the homeless and destitute keep "open house" for the friendless and distressed. A \$200,000 Young Men's Christian Association plant performs the services to which such institutions are devoted.

Charleston has some very beautiful and costly church edifices, and all the leading religious denominations known to the United States are represented by congregations among its people.

The city has a number of extremely handsome business blocks and office buildings, and an extraordinarily large number of beautiful residences, the homes of people of wealth, culture and refinement. In fact, in the matter of beautiful homes Charleston may well challenge comparison with any city in the country of twice its population.

As a business location, as a place in which to found a home and raise a family, Charleston offers attractions and inducements that are in many respects not equalled elsewhere.

St. Albans.

The town of St. Albans, second in size of Kanawha county municipalities, is situated twelve miles below Charleston, at the junction of the Coal river with the Great Kanawha. The location of the town is one of great natural beauty, the broad bottom reaching back from the Kanawha rising to higher reaches of level land and numerous hills and knolls that present most attractive sites for residences. The town for a long time was known as "Coalsmouth," a name that stuck to it long after it was legally given another. In 1868 it was by legislative enactment incorporated under the name Kanawha City, which was changed not long after to St. Albans. At the first election there were but 18 votes cast, indicating a population of about 100, and growth was slow for many years, the census of 1900 showing but 816. The building of the Coal River branch of the Chesapeake & Ohio Railway, however, brought about a more rapid growth in population than the town had known hitherto, and the census takers in 1910 found 1209 persons residing within the corporate boundaries. It is estimated by conservative people that the rapid growth since the last census has taken the population well up to the two-thousand mark.

For many years the principal business of St. Albans was the manufacture of lumber and the trade that naturally flowed in from the excellent farming district lying along the Kanawha and Coal rivers and on the low-lying hills back from them, and through the rich Teays Valley section to the west. The Coal river valley was formerly one of the most heavily wooded sections of the State, and hundreds of millions of feet of high class timber have been floated out of that stream to be sawed by the great mills located at St. Albans. These mills gave employment to many men, and brought many dollars from other communities to be spent with the merchants of the town and to enrich the owners of the timber lands lying on the waters of Coal river and its tributaries. The lumber industry is still a large and important part of the business life of St. Albans, but it has of late been augmented by other things that help largely to swell the total of commercial transactions.

The development of a considerable coal mining business along the upper reaches of Coal river has brought to St. Albans a number of people who are employed either directly or collaterally in handling the output of the mines, and who find the town the most convenient place of residence. Other enterprises have followed in the wake of the coal development, and from then St. Albans has profited in both population and business.

Half a dozen years ago there was a very great impetus given the production of Burley tobacco in the region about St. Albans, and the amount of the product brought there for sale caused the establishment of a large warehouse, through which is sold annually two million pounds of that product. A great deal of money has thus been brought to St. Albans, to be distributed among the farmers who come there to trade, to find its way into the banks of the town, and to enrich the arteries of its commerce generally.

Within the past few years the enterprising business men of St. Albans, having faith in its advantages, have made an organized effort to induce manufacturers, business men and investors to come and participate in the opportunities it offers. These are numerous and varied. First among them, perhaps, is a plentiful supply of cheap fuel. Coal of the best quality is easily and cheaply obtained from the new developments on Coal river or the old ones along

the Kanawha, while a plentiful supply of natural gas comes from immense wells nearby at prices that make it a most attractive fuel for many purposes.

Next to fuel, perhaps, comes transportation, and in this St. Albans is supplied as well as any point in the country. The main line of the Chesapeake & Ohio Railway passes through the town, and the Coal river branch of the same road carries from it into a rich and growing section whose trade needs are constantly increasing. The Kanawha & Michigan Railroad passes by on the opposite bank of the Kanawha river. The Great Kanawha, locked and dammed from its mouth for many miles past St. Albans, furnishes water transportation throughout practically every month of every year. An electric traction line between it and Charleston gives St. Albans convenient connection with the centers of business and finance in Southwestern West Virginia.

The big mills which have been run in and about St. Albans for many years have been the means of bringing to the town an excellent working population, and factories seeking locations will find the labor problem thereby solved to a considerable extent.

Two banks doing business in the town—the Bank of St. Albans and the First National Bank—with ample resources for a largely increased business, are prepared to care for the financial end of the manufacturing problem.

A delightful climate, with universally cool nights, makes the location ideal for manufacturing plants doing heavy work, for refreshing sleep renews the strength and vigor of those who toil, enabling the worker to do a full day's work every day.

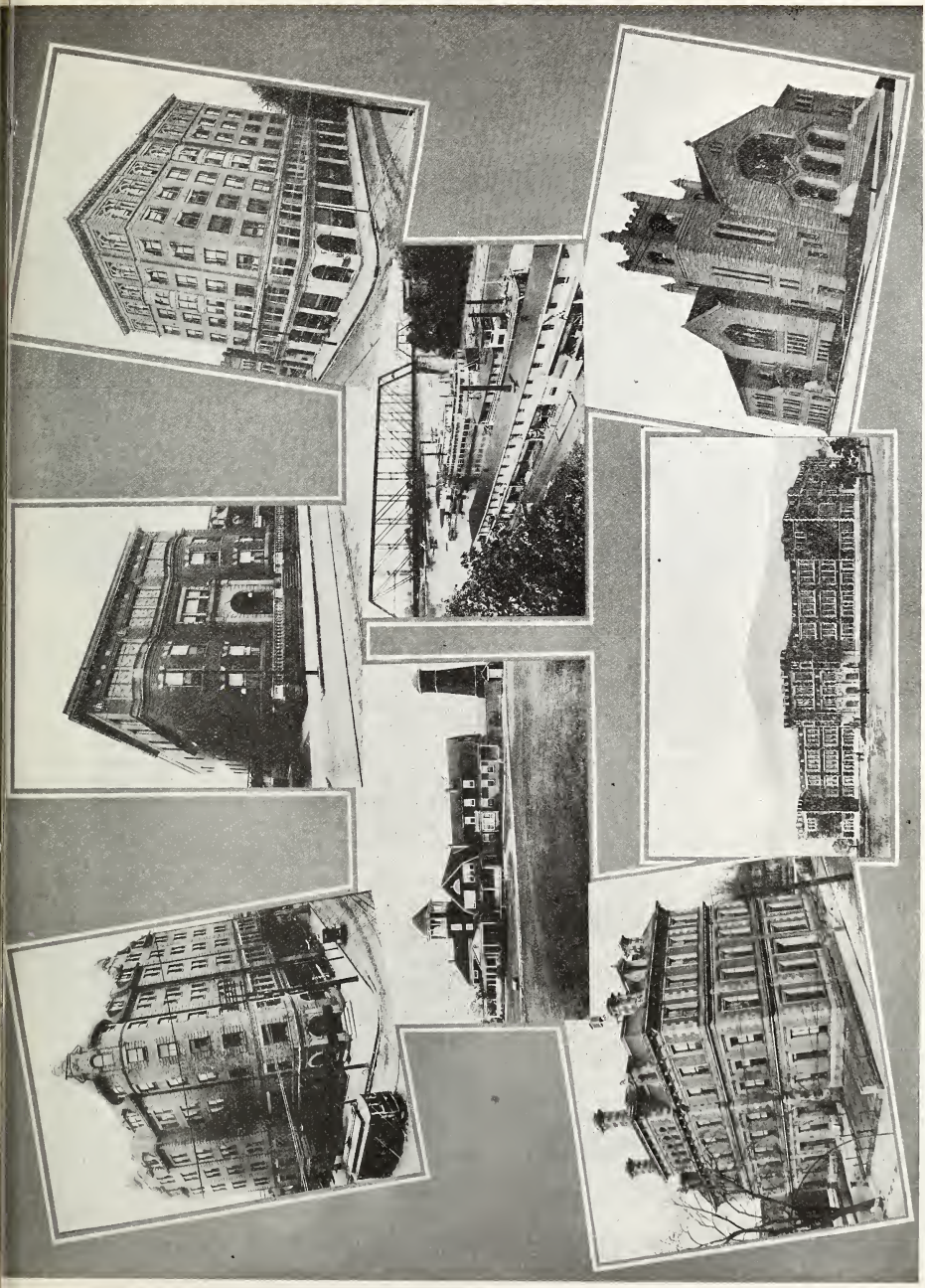
The town has an excellent water system and an electric power plant of ample capacity to furnish light and power for all purposes. These utilities are owned and controlled by home people, and the service is satisfactory and economical. It has an excellent fire department, which gives the people low insurance rates.

St. Albans has good schools, handsome church edifices, beautiful homes, and a population of refinement and hospitality, making it a desirable and delightful place of residence.

Among the concerns that have done and are now doing much toward the success of St. Albans may be mentioned the Bowman Lumber Company, the American Column & Lumber Company, George Weimer & Sons, jobbers and wholesale dealers in rough and dressed lumber, Mohler Brothers, manufacturers and dealers in lumber, the tobacco warehouse and the two banks mentioned above, and a number of enterprising merchants and business men who are conducting establishments smaller in size and influence but no less necessary and helpful.

The enterprising business men of St. Albans, having faith in its eligibility as a place for manufacturing industries, as well as for general business establishments, have been putting forth efforts to secure the location of such enterprises in their town. The effect of these efforts has been seen in the coming in of new men and new money, in the new impulse felt generally throughout the community, and in the rapid growth it has experienced during the past half-dozen years.

It is believed by those who have witnessed the advance of St. Albans during the past decade that its growth in population and business will be even more rapid in the next, and that its past prosperity will be surpassed by that held in store by the immediate future.



MODERN BUILDINGS IN PARKERSBURG—Reading from left to right: Top row—Chancellor Hotel; Elks Club; Union Trust. Center row—Country Club; Little Kanawha and Ohio Rivers. Lower row—Federal Building; High School; M. E. Church.

The City of Parkersburg.

Parkersburg is the growing city of the State. Located at the junction of the Ohio and Little Kanawha rivers, having within the five cent car fare limits approximately fifty thousand people, possessing varied resources and now enjoying a period of expansion unsurpassed by any in the Ohio valley, Parkersburg justifies her claim to the title, "THE BIGGEST LITTLE CITY ON EARTH."

Parkersburg is the center of an oil producing, richly stoned, and manufacturing region. She enjoys ample transportation facilities by both rail and water. She is the recipient of the benefits accruing from the improvement of the Ohio river. The main line of the Baltimore & Ohio Railroad from New York to Cincinnati passes through the city, and another division of the same system gives immediate connection with all points along the Ohio river. The Little Kanawha Railroad extends up the river of the same name, and opens up and makes tributary to Parkersburg one of the richest regions in the State, with possibilities of development unestimated. Interurban lines connect the city with numerous Ohio points, and will be extended to, include additional areas.

A new high speed electric line is assured from the city to Charleston, which will shorten, by half, the present rail distance to the State capitol, and open up a territory from which Parkersburg will reap the richest benefit. Another electric line to Marietta on the Ohio side is projected, running through a territory that is certain to be thickly settled. Other lines are projected to Athens, Ohio, and Pomeroy, Ohio. A bridge is now in course of construction from Parkersburg to Ohio at the cost of \$450,000, which will attract other lines, with Parkersburg as a terminus, and open to this city the rich section of Southern Ohio.

Parkersburg is an industrial and commercial center, and likewise a financial center. There are located here five State banks, five national banks and a trust company, with combined assets of over \$10,000,000, and all doing a healthy business. There are three building and loan associations with assets over \$3,000,000.

Among her tangible assets, Parkersburg points to a \$50,000 Federal building, a \$50,000 free public library, an \$85,000 Y. M. C. A., a \$150,000 Elks Home, a \$100,000 Odd Fellows Temple, a \$250,000 hotel, wholesale houses with over 200 traveling salesmen, sixty daily passenger trains, numerous office buildings, three daily newspapers.

Parkersburg has within its business confines eighty-three manufacturing concerns, with more to come, with capital varying from thousands to millions of dollars. The Baldwin Tool Works, the General Porcelain Works, the Vitrolite plant, the Parkersburg Iron & Steel Company, a Standard Oil plant, the Graham-Bungarner Shoe factory, the Parkersburg Machine Company, the Rig & Reel plant, the Chair factory, the Bentley & Gerwig Furniture Company, the Peerless Flour Mill, The Essex Glass Company, and numerous other substantial concerns, running steadily, have an output sold over the entire country. In addition, the railroad shops, several machine shops and clothing concerns give employment to hundreds of men with a pay roll running into the thousands per week.

An era of expansion not covered in these facts is yet to be told of. A quarter of a million dollar freight terminal is under process of building by the Baltimore & Ohio Railroad. A \$600,000 power plant has been started by the Parkersburg, Marietta & Interurban Railway Company, on which work is being actively prosecuted. Other extensive improvements in the way of extension of

lines are under way by this company. A new high school is to be built at a cost, for site and building, of \$200,000. A Masonic temple, costing over a hundred thousand dollars, is under construction. The bridge across the Ohio is being built. The city's oldest financial institution has just completed a grand new home. Another bank is building a new home on Market street, rapidly becoming one of the busiest and handsomest streets in the State. Another bank is remodeling its home at a cost of \$50,000. Numerous other structures are in course of construction, less imposing perhaps as to figures, but in line with the commercial and industrial expansion of the city. The completion a few months past of one of the largest wholesale houses in the Ohio Valley should not go unmentioned.

As an inducement to manufacturers the city offers its commercial advantages, an inexhaustible supply of coal, cheap gas, and cheap electric power sufficient to meet the demands of a city many-fold its size. The advantages of oil in whatever line, are here in abundance.

The City of Parkersburg points with an unusual degree of pride to her public school system. This year the graduating class of the high school exceeded the century mark in numbers, and this has the distinction of being the first city in the State to graduate so large a number. Experts pronounce the system unexcelled in the State.

The moral atmosphere of the city is above the average. The city is in the vanguard of civic progress. Her churches are of modern structure and such as few cities can boast of.

The city is governed by a commission, and all public affairs are honestly, quickly and efficiently administered under this most approved form of municipal government.

The streets of the city are models of cleanliness, and are beautifully lighted with boulevard lights. Extensive paving improvements are being carried on. The city has just expended \$200,000 in paving, and the people have authorized the expenditure of another similar amount. The city has a \$450,000 water works and filtration plant and enjoys as pure water as any city. The health of the city is above the average as shown in the reports.

Parkersburg, known as the "convention city," is host to innumerable State gatherings and conventions. Its advantageous location, its railroad service, and its hospitality draw almost weekly some important State gathering.

The city has a Board of Commerce alive constantly to its civic needs. The interest shown in the affairs of the city, the keen purpose of the business men ever awake to building it up, are the envy of all who visit Parkersburg. The Board has just completed a campaign put on by local talent entirely, and has an active paid-up, thriving membership of eight hundred.

Parkersburg is surrounded by rich agricultural country, in addition to her other natural advantages. The farmers are rapidly applying scientific methods to the cultivation of the soil, through the services of an expert employed by the county. Wood county, in which Parkersburg is situated, has made greater progress recently in agriculture than any other county in the State. Pure bred registered live stock has increased more rapidly in this county than in any other in the State. Registered horses, cattle and hogs have increased more than 500% in the last 5 years.

Very soon all the roads leading into the city, and within a radius of many miles of it, will be paved. The surrounding districts are voting bonds, and many are now at work on making permanent improvements.

White Sulphur Springs.

America's Most Famous and Most Modern Watering Place.



The Greenbrier.

No other watering place in the country has about it so much of the glamour of romance, so much of the distinction of historic greatness lent by its connection with men and events of moment in the affairs of the country, as has the old White Sulphur Springs. Lying in Greenbrier county, West Virginia, just inside the line that divides that State from its mother, the Old Dominion, the location of the White is one of unrivalled beauty. The grounds occupy a deep low-gap in the mountain that admits of smoothness of topography, the while they are surrounded by mountain heights that preserve to the scenery the rugged picturesqueness of the Allegheny highlands.

Records show that the medicinal properties of the springs that give the White its name were recognized by

settlers as far back as 1778, and tradition has it that they were long before held in high esteem by the Indians. The first hotel was built there in 1808, and from that time to the beginning of the civil war the White was the favorite gathering place of Southern aristocracy. It was favored also by the early presidents of the country, and many statesmen and politicians of the elder day made it a place of meeting in which to lay plans for the good of the country and discuss schemes for the downfall of the opposition. Other notables of days ago also visited the White for one reason or another, and altogether it was made the most famous resort in America.

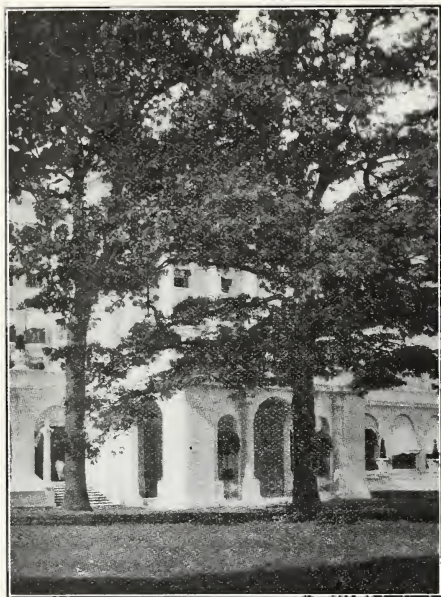
The old registers of the Hotel bear the autographs of many distinguished men, whose names are imperishably written upon the pages of history. Commodore Stephen Decatur wrote his name there in 1816. Henry Clay, Rufus



A Row of Cottages.



An Arm of the Lake.



A Glimpse of one of the Portals.

Choate and Millard Filmore met there in conference in 1817. In 1854 Franklin Pierce, then president, spent a large part of the summer there. These are but a few of the world-known names that render those old books priceless to their owners.

The elevation of the White is about 2,000 feet above sea level. Its summer climate is ideal. It is never too hot in the day time, and the nights are invariably cool, so that "sleep, which knits up the ravelled sleeve of care," may be enjoyed there during the year's warmest periods. Situated on the southerly face of the mountain, protected on all sides by towering peaks, the winter weather is delightful, being free from the lashing winds that sweep over points less perfectly protected. The winter air is crisp and invigorating, but lacks the rawness and penetrating chill that characterize the atmosphere of low, damp localities.

The grounds of the resort slope gently down from the low-gap to a wide valley through which winds a clear stream of living water, and are covered with stately forest trees, mostly oaks, that date from the time when the centuries were young. These grounds are exquisitely kept, with walks and drives among the forest trees, presenting the appearance of a well tended English park.

From the beginning of the life of the White as a watering place it was conducted exclusively as a summer resort, the great old hotel, "The White," with its rambling architecture and its long, wide galleries, being kept open during that season only. But with its passage into the hands of new owners a few years ago plans were laid to make it a resort for all the year around. A magnificent new hotel, the Greenbrier, was erected, constructed entirely of steel and concrete, furnished sumptuously and

equipped in a manner that makes it the finest and best appointed resort hotel on this continent. It is of Georgian architecture, as befits its setting among the trees, massive in design and surpassingly beautiful. Its equipment embraces a heating plant that keeps it as pleasant in winter as the high elevation and forest-blown breezes render it delightful in summer.

The management of the Greenbrier is the same as that of the Plaza in New York City, which is to say that it is the last word in modern hotel service—rooms carefully kept, tables loaded with the best the market affords, cooking beyond criticism, service prompt, attentive, intelligent. During the summer season the old hotel, "The White," is also open and conducted by the same management. The owners of the resort have their own farm, dairy and market garden, which furnish the best of milk, cream and butter, an abundance of fresh, crisp vegetables. The direct railway connection with the seashore, gives the advantage of a supply of carefully selected and properly handled sea food, an advantage not usual to mountain resort hotels.

In addition to the two hotels, where hundreds of guests can be accommodated, the White has numerous cottages, which may be leased during the summer season by parties or families, invalids, and those with young children, who prefer their privacy to the more public rooms of the hotels. These cottages are in groups fancifully known as "Virginia Row," "Florida Row," "Louisiana Row," "Carolina Row," "Baltimore Row," "Paradise Row," "Bachelors' Row," to which is to be added the "President's Cottage," devoted to other days to the occupancy of chief executives of the nation.

Part of the splendid improvements that have recently brought this famous old resort down to date is a magnificent new bath house, in point of equipment the most complete in America, with all the appliances necessary for giving every kind of bath known and approved of the medical profession. These include the Radium Nauheim, and Vichy baths, the Aix Douche, Radio-Active Sulphur and Mud baths, the Electric and Electric Light Treatments, the Turkish, Russian and Continuous-Flow baths, with, also, the various kinds of douches and sprays. In this establishment special attention is given to administering packs, massage and other accessory measures, and there is also a Radium Emanatorium and Inhalorium for utilizing the volatile properties of the sulphur water. Both the last named features are unique in American health resorts, and are proving as popular here as abroad.



The White, West Front.

In addition to these features there is a splendid swimming pool, 100 x 50 feet in size, the continually flowing water in which is kept at a delightful temperature at all seasons, in which visitors are wont to enjoy frequent plunges. There is also a well-equipped gymnasium and a Zander-Herz Institute for mechanical treatments, as well as an Electric and Clinical Laboratory. In fact this bath house was designed and is equipped to be, as it is, the most perfect on the American continent.

The baths are under the direct personal supervision of Dr. G. D. Kahlo, former medical director at French Lick Springs, and Professor of Medicine in Indiana University. He has made a life study of the use of medicinal waters in the treatment of bodily ailments, and is recognized as an authority on the subject in all its branches.

Here then, within the boundaries of their own country, the people of the United States may enjoy the advantages of the most famous spas of Europe, without the expense and inconvenience of the long ocean voyage.

For amusement and recreation opportunities are here in almost endless profusion. There are beautiful paths along the valleys or on the mountain sides for those who delight in walking or climbing; excellent roads for riding,

the ball-room is the scene of nightly dances and formal balls. The Morning Cotillon is an institution at the White not found at other resorts. Dancing at high noon has become the custom of years. In short, it has been said by those who visit the White that there are not enough hours



The New Bath House.

in day and night for all the gayeties provided and encouraged by the management.

If it is rest and recreation, health, pleasure, beautiful scenery, association with fashion, culture or renown—for many of the leading people of the country in every walk of life take their vacations at the White—or a combination of two or more of these, there is no other place—in any country—where they can be found in such overwhelming abundance as at the old White.

Nor must you search for it in some out-of-the-way nook or faraway spot, inconvenient of access, to be reached only by onerous travel on slow trains, over rickety railroads. White Sulphur Springs is on the main line of the Chesapeake & Ohio railway, which runs trains that, in point of comfort and elegance, are unsurpassed by those of any other railroad. The run is but fourteen hours from New York; twelve from Philadelphia; ten from Baltimore; nine from Washington and Richmond. Supper may be eaten at the usual hour in these cities and breakfast next morning—and that not late—in the great dining room of the Greenbrier, close to the top of the Allegheny mountains. From Pittsburg, Cleveland, Chicago, St. Louis and the other cities of the Middle West the time is little more, and the White is of easy access from all on fast trains carrying through regions that present to the traveler's view scenery of rugged grandeur that is in itself full compensation for the journey.

Thus it is that "The Old White," long the rallying point of the wealth and aristocracy of the country, and still redolent of the gallantry and chivalry of the Old South, is coming into its own again, with the promise of a future that will surpass even its own delightful past. The stage coach of other days has been replaced by the railroad train, electric lights have succeeded the old tallow "dip" and later coal oil lamp for lighting purposes, and in every way the White has been brought down to present day convenience and luxury, while still retaining the name and fame acquired during a century of popularity, and preserving the fine traditions of the elder day.

On all this wide continent there is no other all-the-year resort to equal it.



The Spring.

driving or motoring—roads that lead along lovely streams and through bewitching forest shades. There is a golf course of the full eighteen holes, and an additional nine holes, laid out under direction of an expert, and declared by devotees of the game to be unsurpassed for general attractiveness. The club house is conveniently located at the first tee, and in the entire matter of layout and equipment the comfort, convenience and pleasure of the players have been kept uppermost in mind. The tennis courts are excellent, and kept in the best of condition at all times.

There is good fishing right at hand. Howard's creek flows through the grounds, stocked with rainbow and mountain trout from the Government fishery hard by, and Greenbrier river, one of the most notable bass streams in the country, is but a short distance away. The Hotel Corporation maintains its own pack of hounds, and drag hunts have become an established feature of the season.

There is an attractive Casino for card parties, private breakfasts, luncheons, teas and informal receptions, while

The Chesapeake & Ohio Railway.

A Trunk Line Traversing the Most Beautiful Scenic
Country in the East.



Narrow Falls, New River Canon.

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Of the country's great trunk line railroads the Chesapeake & Ohio easily occupies first place in the matter of the natural and historic attractions of the country through which it passes. From the broad reaches of the coastal plain the road in its western flight passes into the Piedmont Valley, crosses the Blue Ridge, and then descends into the Garden of the Shenandoah. Then comes a 200-mile stretch of the boldest mountain scenery between East and West. Up and up the route lies, until it reaches the crest of the Alleghenies, and begins the descent that carries along the valley of the beautiful Greenbrier and into the canons and gorges of the New River, than which there is no other spot east of the Rocky Mountains that furnishes scenes of such rugged grandeur. Here is no mere flashing by of scenic wonders, but a run of hours' duration through scenes of lofty mountains, towering cliffs and beautiful water falls that call forth continual exclamations of delight from those who view them for the first time.

From the rough and precipitous New River the road suddenly makes its way to the quietly flowing Kanawha, and thence for miles through broad bottom lands bordered by low hills and dotted here and there with cities, towns and villages. Then over a low divide, once the bed of the Great Kanawha, to the beautiful Ohio, at the mouth of the romantic Guyandotte. Thence for almost two hundred miles the road follows the course of the Ohio to Cincinnati, or, leaving the river to the west, traverses the famous Blue Grass Region of Kentucky to find itself again on the Ohio at Louisville.

From Chesapeake Bay to the Ohio river, and thence to either Cincinnati or Louisville, the route is one of entrancing beauty, unrivalled by that of any other road east of the Mississippi, and surpassed by none west.

In the mountain regions the road passes through a thermal belt which nature has lavishly blessed with mineral springs that give forth waters of marvelous curative powers. The sulphur, lithia, alum and healing springs of this wonderful region have been tried by ailing people all over the world, and their virtues, tested by time

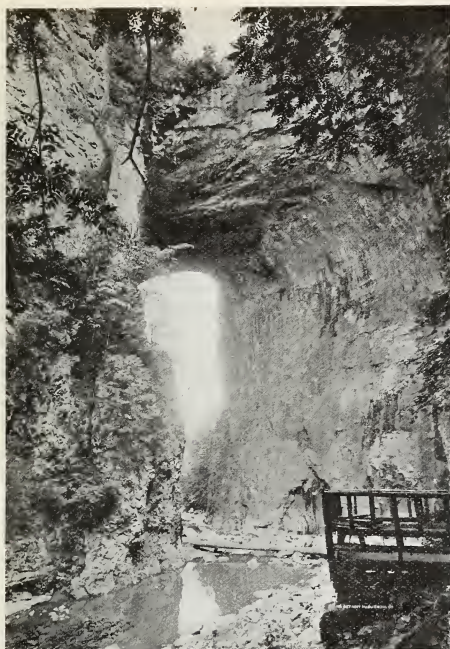
and certified by the medical profession generally, are now established beyond all dispute.

Along the line of the Chesapeake & Ohio are many attractive summer resorts, among them being the Warm, Healing and Sweet Chalybeate Springs in Virginia, and the Old Sweet and Red Sulphur in West Virginia. In addition to these there are three of the most noted all-year resorts in the country, without mention of which no story of the Chesapeake & Ohio would be complete. These are Old Point Comfort, at the eastern terminus of the road on Hampton Roads, the Virginia Hot Springs, near the top of the Alleghenies on the eastern slope, and the White Sulphur Springs, in West Virginia, near the top of the mountains on the western side.

At Old Point Comfort is the well known Chamberlin hotel, noted for years as one of the best resort hotels in the country. Situated right on the water, its broad piazzas paralleling the shore not ten yards away, the view is of the open water in which ships from all nations are to be seen now and again riding at anchor, while at frequent intervals a large portion of the United States navy is stationed there, the officers from the vessels mingling in the gaieties of the hotel life. Fort Monroe, with her rampart walls and girdling moat, but a short distance away, gives a touch of mediaeval picturesqueness to the scene.

The Chamberlin is fitted up with all proper equipment for the accommodation of many guests, and in point of pleasantness of rooms, excellence of cuisine and general service has no superior in the country. Situated on waters famous for fish and shell fish of all kinds, the Chamberlin makes a specialty of sea food, and has achieved a nationwide popularity in that respect. It is equipped with excellent bathing facilities, its Electro-Hydro-Therapeutic Department being, beyond dispute, the best in the country.

The Virginia Hot Springs, with the magnificent Homestead Hotel, is situated in the Great Hot Springs Valley, at an elevation of 2,500 feet above sea level. This is one of the most beautiful spots in the Allegheny mountains, and the hotel itself is noted among the best of resort



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Natural Bridge.

hostelries. The bath house in connection with the hotel is handsome and well appointed, and the baths are of many kinds. The waters have been found especially efficacious in cases of gout, rheumatism, obesity, nervous prostration, sciatica, neurasthenia, locomotor ataxia and general diseases of the nerves.

For the amusement and entertainment of guests there is one of the best golf courses in America, laid out with mathematical exactness, and kept like a lawn about a private home. Players come to the Hot from all over the country merely for the pleasure of playing over this excellent course. There are numerous tennis courts, all kept in perfect condition. About the hotel there are many delightful walks and drives, and many points of beauty well worth visiting.

The White Sulphur Springs is located in Greenbrier county, West Virginia, just across the border, on the western slope of the mountains. Long famous as the leading summer resort of the South, with the building of a new hotel, the Greenbrier, two years ago, the White has become, almost, you might say, overnight, one of the most popular all-year resorts in the country. A great new bath house, fully equipped for all kinds of curative baths, has brought it into prominence as the "Cure of America," and invalids of all kinds and those who have "run down" from overwork visit the White, finding there, in the pure, crisp air and fine medicinal waters the rehabilitation of health and strength for which they seek.

All these Chesapeake & Ohio resorts are easily and

quickly reached from the country's greatest centers of population, east and west. Practically but a night's ride in Pullman or compartment sleeper from New York, St. Louis, Chicago and points between, the busy man of affairs may put in several days of the week at any one of these resorts without material interference with business. There is no better service given on any road in this country than that furnished by the Chesapeake & Ohio, and journeying to any of these points is not only swift, but comfortable and attractive. The Chesapeake & Ohio carries the best modern equipment, including steel Pullman sleepers and the famous C. & O. dining cars, providing a la carte service of unusual excellence.

The Chesapeake & Ohio Railway, in addition to its main line from Newport News through Richmond and Gordonsville to West Virginia points, has a line that borders the historic James river from Richmond to Iron Gate, Va., passing through many places of interest and numerous scenes of great natural beauty. Among these latter is the Natural Bridge in Rockbridge county, accounted one of the greatest natural curiosities of the world, and famous on every continent. In its course through the New River canon it passes Hawks Nest, a cliff rising 1,292 feet sheer above the river's tide, and forming one of the most striking pictures encountered in a course full of natural wonders. Richmond Falls and Kanawha Falls are scenes of great beauty, and Chimney Rock lends its own enchantment to the view.

By day along the road through the mining regions are to be seen the picturesque mining villages, perched in some instances upon hillsides where is scarcely pathway for the goat, and at night long lines of coke ovens with their glowing fires cast a weird red light over surrounding

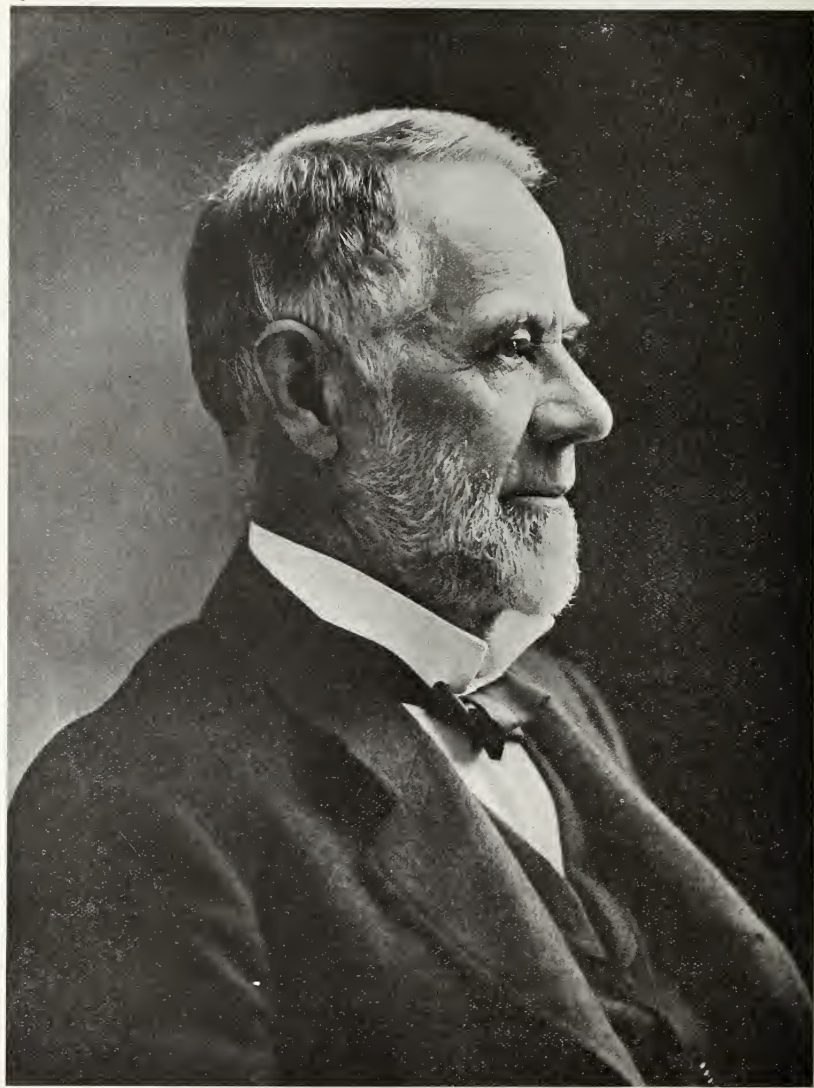


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In the New River Canon.

objects. Great rocks on mountain tops have the appearance of huge castles, towers and battlements, and from height to height dash dazzling streams of crystal water, finishing the picture with a touch of wildest beauty.

The Chesapeake & Ohio furnishes the most direct route from the cities of the Middle West to the Atlantic seaboard, and with its great through trains and fast service offers inducements to the traveling public not duplicated by any other route.



HON. H. G. DAVIS.

Hon. Henry Cassaway Davis.

In the matters of both political prominence and material accomplishment Hon. H. G. Davis holds unchallenged primacy among West Virginia's citizenship. Legislator, both State and national, political leader, candidate of one of the great parties for Vice-President, railroad constructor, city builder, coal operator, banker, philanthropist—in all these roles he has won distinction, and the present time finds him, at the age of almost ninety-two years, still active of body and acute of mind, and still engaged in the management of large business enterprises.

Henry Cassaway Davis was born at Woodstock, Maryland, November 16, 1823, the son of Caleb D. and Louisa (Browne) Davis. His father died while he was yet in his boyhood and his early life was one of hard work and strict economy, giving him opportunity for but little schooling. At nineteen he was employed as freight brakeman on the Baltimore & Ohio Railroad, being promoted from that position to one as conductor of freight trains, and soon thereafter to passenger conductor. So near the beginning of the railroad business was this that he was the conductor of the first passenger train ever run at night. In 1847 he was made supervisor of the railroad, which at that time ran only as far as Cumberland. Seven years later he became agent at Piedmont, Hampshire county, Virginia, (now Mineral county, West Virginia.) In 1858 he resigned his place with the railroad to enter business with his brothers, William R. and Thomas B., who had come to Piedmont meantime and engaged in the shipping of lumber and coal. The same year he organized the Piedmont Savings Bank and became its president, a position he retained after it changed its charter and became the Davis National Bank. The need of a large amount of timber to restore the Baltimore & Ohio Railroad after the destructive war period brought large opportunities to the Davis brothers, and they furnished millions of feet of it from property they secured on the summit of the Alleghenies.

The far seeing mind of Mr. Davis early realized the immense possibilities for large prosperity presented by the vast and varied natural resources of West Virginia, and he bent his energies to a plan of construction that has brought a tremendous development to a section that was up to the time it engaged his attention an almost trackless wilderness. In 1883 he refused to be a candidate for re-election to the United States Senate, in which body he had served two terms distinguished by great usefulness to the country, that he might give his time and attention to building the West Virginia Central Railroad, a road designed to connect the Baltimore & Ohio and Chesapeake & Ohio lines, and to open up a region unsurpassed in timber, mineral and agricultural potentialities by any section of equal area in the world. This road, connecting with the Baltimore & Ohio at Cumberland, Maryland, was built through the counties of Mineral and Tucker and into the magnificent coal and timber regions and fertile valleys of Randolph and Barbour, causing prosperous towns to spring up and bringing about the opening of mines, the erection of mills and factories, the extension of agricultural interests, the organization of banking institutions, and the establishment of manufacturing plants and mercantile houses along its way. In many of these enterprises Mr. Davis was directly interested, and some of them he personally organized and controlled.

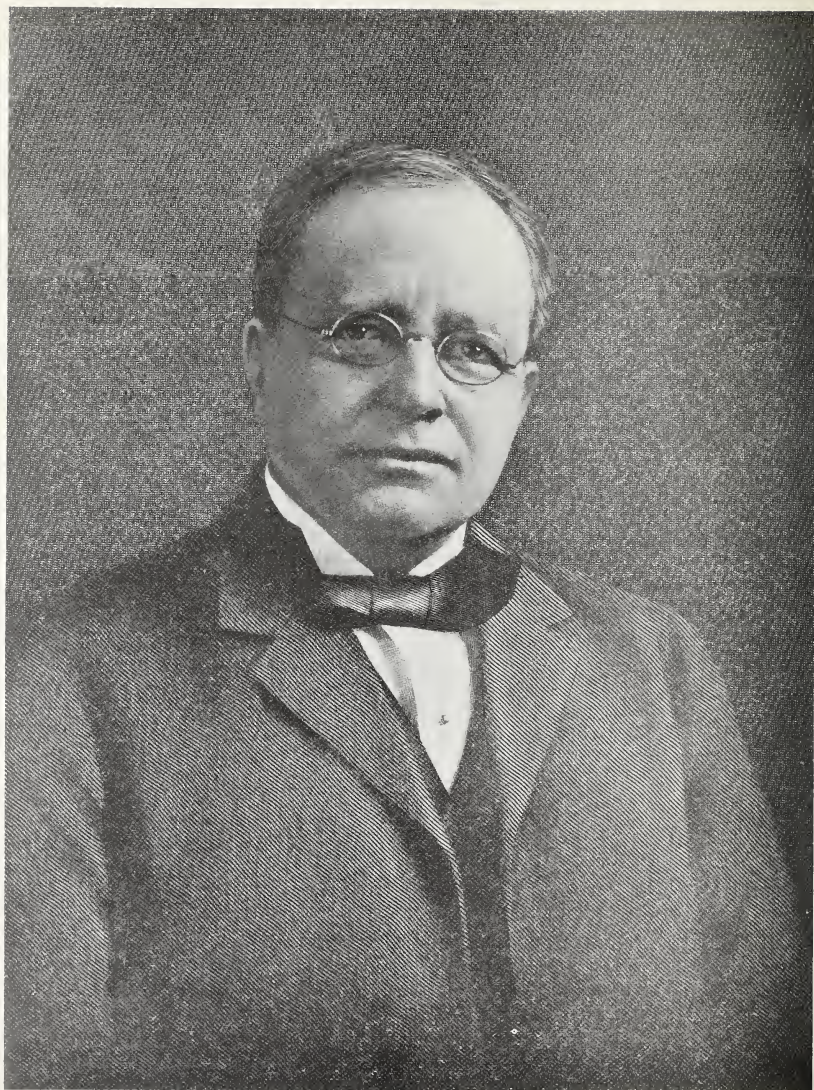
In the early years of the present century the West Virginia Central road was purchased by the Western Mary-

land, of which it is now an important part, and Mr. Davis passed from its active direction. But, though some years beyond the three-score and ten allotted for man's usefulness, he refused to stand idle while his State needed his constructive work, and so acquired by purchase the Charleston, Clendennin & Sutton railroad, a short line running up the Elk river from Charleston some fifty miles. This he extended to the city of Elkins, 175 miles from Charleston, where it connects with the Western Maryland, thus carrying out his early plan of building a connecting line between the Baltimore & Ohio and the Chesapeake & Ohio. This connecting road, now known as the Coal & Coke, passes through the center of the State, and has been the means of developing some of its best coal territory.

These are but a few of the salient points in the active constructive life of this remarkable man, but they serve to show the bent of his mind and to give the reader some idea of what he has accomplished in the development of the material interests of his adopted State.

In the domain of politics the fame of Henry G. Davis has even wider reach than in that of business. Having opposed secession and remained a Union man during the war, and yet being a Southerner by birth and instinct, it was natural that he should oppose the drastic measures by which the more radical of the Union men sought to punish those who had cast their lots with the Confederacy, and as a Union Conservative he was, in 1866, elected a member of the low house of the State legislature. He was elected to the State Senate in 1868 and re-elected in 1870, and during the session of 1871 was chosen by the legislature, which was then Democratic, as United States Senator to succeed Waitman T. Willey, whose term of office expired in March of that year. In 1877 he was re-elected by the votes of both parties. He refused to be a candidate for re-election in 1883, preferring to devote his time and ability to the constructive work in which he had formerly been employed. In the United States Senate he was for two years chairman of the powerful committee on appropriation, and when the Republicans again controlled that body they created a committee on transportation routes for the special purpose of providing Senator Davis with a chairmanship, while he still retained his place as ranking member of the appropriations committee. He was chairman also of a special committee created to investigate the system of book-keeping in the United States treasury department, as a result of charges made by him, and substantiated on investigation, that the methods then in use were inaccurate and unbusinesslike. In 1884, a year after his retirement from the Senate, he was prominently mentioned as a candidate for the Vice-Presidential nomination before the Democratic convention, but refused to allow the use of his name, and was instrumental in bringing about the nomination of his friend and former colleague, Thomas A. Hendricks. In 1904 he was nominated for Vice-President by the Democratic convention which nominated Alton B. Parker for President.

Mr. Davis was married in 1852 to Kate, daughter of Judge Gideon and Caroline (Warfield) Bantz, of Frederick, Maryland, and is the father of five children: Hallie, who married Stephen B. Elkins; Kate, who married R. M. G. Brown, of the United States Navy, and who has been dead some years; Grace, who married Arthur Lee; Henry Cassaway, who has been dead for a number of years; John T., who is a prominent business man of Elkins.



HON. A. B. FLEMING.

Aretas Brooks Fleming.

For more than a century the Fleming family has occupied a prominent place in the history of the two Virginias, and Aretas Brooks Fleming, former governor of West Virginia, is perhaps as widely and favorably known as any man within the borders of the State.

The name is as old as any of the many time-honored family names of Scotland, and has worthy connection and honorable mention in numerous important events in Scottish history. During the seventeenth and eighteenth centuries when stormy political and religious controversies were prevalent, when reason and justice were supplanted by prejudice and wrong, four brothers of the Fleming family, William, Robert, Archibald and John, through religious tyranny, were driven to the North of Ireland, where the people of Scotch-Irish ancestry were gathered in considerable number just previous to their immigration to America, where a larger opportunity awaited them in the trackless forests of the New World.

It was in 1741 that the four brothers emigrated to this country, settling on the Delaware river in what is now Kent county, Delaware. In 1789, John Fleming, with three of his brother William's sons—Nathan, Boaz and Benoni—removed to the Valley of the Monongahela in western Virginia, where they formed settlements.

William Fleming, son of Nathan and Lydia (Russom) Fleming, was born April 24, 1775. He married Ann, daughter of Matthew Fleming. To this union were born Isaac, Amelia, Joseph, Benjamin F., Mary Ann, Solomon S., and Franklin J.

Benjamin F. Fleming, father of Aretas Brooks Fleming, was born in 1810 and died October 28, 1876. He married Rhoda Brooks, daughter of Rev. Asa Brooks, a Presbyterian minister who became noted in the early religious history of the Monongahela Valley. The children born to Benjamin and Rhoda (Brooks) Fleming were Aretas Brooks, whose name captions this article; Robert F., now deceased; George M., of Buckhannon; Lucy, married to Frank E. Stewart. She removed with her husband to Montana, where with her one child, a daughter, she died in 1903.

Governor Fleming was born on a farm near the present town of Fairmont, Marion county, on October 15, 1839. His early life was spent on the farm and in attending private and select schools of the neighborhood and at Fairmont. In 1859, at the age of 20 years, he completed a course in law at the University of Virginia. He taught school in Marion and Gilmer counties, and afterwards began the practice of law in Gilmer. When the Civil War broke out he returned to Fairmont and in 1863 was elected prosecuting attorney for Marion county and in 1865 was reelected for a second term. The war over, he formed a partnership with Judge Alpheus F. Haymond, who in 1872 was elected judge of the Supreme Court of Appeals of the State. In the same year Mr. Fleming was elected to the house of delegates from Marion county, and was again elected in 1874, during his two terms serving on the judiciary and the taxation and finance committees.

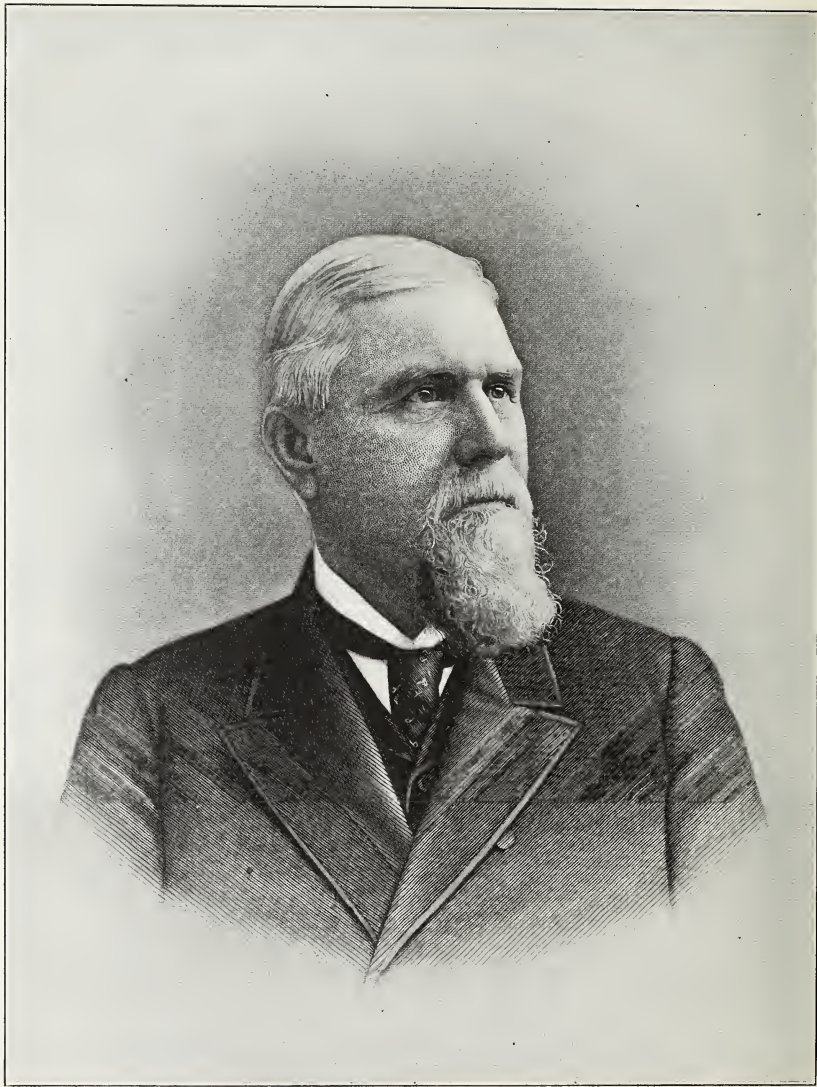
In 1878 on the death of Hon. Chas. S. Lewis, judge of the second judiciary circuit, Governor Henry M. Matthews

appointed Mr. Fleming to fill the vacancy, and for the ensuing election he became the nominee of his party and was overwhelmingly elected to succeed himself. He carried every county, although the circuit was largely republican in politics. In 1880 he was again elected in his circuit comprising six counties, four of which were republican. He was also elected judge of the new circuit provided for by constitutional amendment, and composed of Monongalia, Marion and Harrison counties. This circuit was also largely republican, but he carried it by a large majority. This occurred in a presidential year, and was a very flattering approval of his efficiency as a public servant. For more than ten years Judge Fleming continued to occupy the bench. In August, 1888, he was nominated for Governor of the State by the democratic convention at Huntington, opposing General Nathan Goff on the republican ticket, the latter now United States Senator, who had served his State in many positions of trust and honor, a brilliant orator and the idol of his party. The face of the returns showed the democratic candidate had been elected with the exception of governor, General Goff having received a small majority on the canvass of the votes. The State committee and leading democrats insisted on the inauguration of a contest for the office before the legislature on the grounds of illegal votes being cast in the new mining regions on the Norfolk & Western railroad. The legislature on February 4, 1890, declared Judge Fleming duly elected governor, and on the 6th day of the same month he was inaugurated. The contest developed no personal animosity between the two candidates. They were lifelong personal friends, and still possess the highest regard for each other. Governor Fleming's administration was marked by an era of retrenchment and economy in the administration of the State's affairs. Much of his time as chief executive was devoted to inducing capital to enter the State for investment, to aid in railroad extension, the development of the mines, the vast timber lands, and the oil and gas fields.

During most of his business life, Governor Fleming has been closely identified with the development of the coal mines of the Upper Monongahela Valley, and closely connected with all the coal operations of the Watsons, which are now operated under the name of the Consolidation Coal Company.

Governor Fleming married, September 7, 1865, Carrie M., daughter of James Otis and Matilda Watson. To this union children were born as follows: Gypsy M., married Charles E. Ward, of Charleston; Ida W., married Walton Miller, of Fairmont, and died in 1906; George W., and Virginia W., twins; A. Brooks, Jr. George W. Fleming is one of the vice presidents of the Consolidation Coal Company, with headquarters in Baltimore. A. Brooks Fleming, Jr., is assistant manager of the West Virginia division of the Consolidation Coal Company.

Aretas Brooks Fleming as legislator, judge and governor has served his native State with distinction to himself, honor to his family, and fidelity to the people of the Commonwealth. Now, at an age when most men are wont to enjoy their ease, he is still actively engaged in the practice of his profession and the management of large business affairs in which he is interested. He resides in Fairmont in a beautiful home in which hospitality is generously dispensed and contentment is a perpetual guest.



HON. J. N. CAMDEN.

Hon. Johnson Newlon Camden.

Without disparaging the achievements of any other, it may be said that of West Virginia's sons no other has contributed so much to the material up-building and general progress of the State as did the late Senator Johnson N. Camden, of Parkersburg. He was one of the first in the development of the oil interests, was one of the most extensive railroad builders, and was responsible for the development of some of the richest coal and timber regions of the State. He was a banker of unusual ability, a financier of uncommon acumen, a business man of large vision, a politician of great usefulness.

Johnson Newlon Camden was born at Collins Settlement, Lewis county, Virginia, (now West Virginia), March 6, 1828, the son of John Scribner and Nancy (Newlon) Camden. He died at Parkersburg April 25, 1908. His parents having moved to Braxton county in 1838, it was there he passed his boyhood and early manhood, amid scenes of frontier-like simplicity. He attended the Northwestern Academy at Clarksburg for two years, and then went to the Military Academy at West Point, but resigned his cadetship after two years to take up the study of law. He was admitted to the bar in 1851 and was almost immediately appointed prosecuting attorney for Braxton county. The following year he was elected to the same office for Nicholas county. He early became interested in the wild lands of the central portion of the State, and began to purchase large boundaries, many of which he held until their sale added very largely to the fortune he accumulated in later years. In 1853 he went to Weston to reside and was made assistant manager of a branch of the Exchange Bank of Virginia established there. After remaining with the bank for four years he again took up the practice of the law, and extensive dealings in wild lands. The law he soon again abandoned, and devoted himself to the promotion of new industries and enterprises, the character of work to which he devoted almost his entire business life, and in which he achieved such signal success.

Soon after his abandonment of the law as a profession Mr. Camden became interested in the production of oil from canal coal, and he had hardly embarked upon that business when the first oil strike made at Burning Springs, in Wirt county, attracted his attention. He was quick to see the possibilities of the oil producing business, and soon after the first producing well had been brought in he had secured a lease, organized a company and begun to drill a well. The well came in with a production so large that the output was run through troughs into flatboats on the Little Kanawha river, and even held in dams built across a small stream nearby. The first week's production yielded the company \$23,000. The Civil War came on shortly afterwards and the oil field was abandoned by most of the operators, but Mr. Camden continued his operations during the whole of that stormy period. In 1862 the First National Bank of Parkersburg was organized with Mr. Camden as president.

In 1869 he and his partners sold their old producing property on the Little Kanawha and entered the refining business, erecting a refinery at Parkersburg. As the production of oil in West Virginia declined, before the discovery of the deepsand pools, the refinery was frequently embarrassed by lack of crude petroleum, and in trying to overcome this difficulty Mr. Camden was brought into association with the Standard Oil Company, just then beginning to attract notice as a commercial entity. He entered into an alliance with the Standard, and was made

a director, with charge of its business in Maryland and West Virginia. The Parkersburg business was conducted under the name of the Camden Consolidated Oil Company, and became one of the most prosperous concerns in the country. When the export business of the company grew to large proportions and it became advisable to move the refineries to the seaboard, Mr. Camden brought about the consolidation of the refineries at Baltimore, under the name of the Baltimore United Oil Company, with a capital of a million dollars, of which he was made president. He resigned from his official connection with the Standard Oil Company when, in 1881, elected to the United States Senate.

In the early eighties Mr. Camden organized the Ohio River Railroad Company and built the line of road from Wheeling to Huntington which is now a part of the Baltimore & Ohio system. Before that he had helped to build a narrow gauge from Clarksburg to Weston, and this was later widened to standard gauge and extended to Sutton, in Braxton county, and then to Richwood, in Nicholas county. He built the road from Clarksburg to Fairmont, for the purpose of developing the rich coal lands lying on the West Fork and Monongahela rivers. The Richwood line and the Fairmont line have been incorporated into the Baltimore & Ohio system, and now form a part of the direct line from central West Virginia to Pittsburg. The building of these roads brought about the development of the lumber and coal industries of the sections penetrated by them, in both of which industries Mr. Camden was largely interested, and generally the dominating factor.

He joined with Hon. Henry G. Davis in building the West Virginia Central & Pittsburg railroad, now a part of the Western Maryland system, and was active in building or promoting a number of other roads that have borne an important part in the development of West Virginia. In fact there was hardly any section of the State, no matter how remote, that was not made to profit by his keen foresight and strong constructive faculty.

Mr. Camden was nominated as the candidate of the Union Conservative party for governor in 1868, but was defeated at the polls. He was again nominated in 1872, but by reason of a split in the party was again defeated. He was not again a candidate for office until 1880, when the insistent demand of his friends caused him to become a candidate for the United States Senate. He was elected to the Senate in January, 1881, and took his seat in March of that year. In that body he attained at once a position of influence, by reason of his strong grasp of practical affairs, and the thoroughness with which he went to work to master intricate problems of government, and especially those having to do with fiscal and financial affairs. He was defeated for re-election in 1887 by reason of defection in the ranks of his party, but was chosen in 1893 to serve out the unexpired term of Senator John E. Kenna, who died in that year. He retired from the Senate finally on March 4, 1895, and thereafter devoted himself to the management of his large business affairs. He was a delegate to the Democratic National conventions of 1868-72-76-04.

Senator Camden was married in 1858 to Anne Thompson, of Wheeling, who is still living, and was the father of two children, Annie, now Mrs. Baldwin Day Spilman, whose home is at Warrenton, Va., and Johnson Newlon, now residing at Spring Hill, Ky., who has just finished a short term of service in the United States Senate from that State.



HON. G. W. ATKINSON.

Hon. George Wesley Atkinson.

George Wesley Atkinson, than whom West Virginia has no son the people have more delighted to honor, was born on an Elk river farm in Kanawha county (then Virginia) in 1845. He grew up in Kanawha, and after securing what advantages he could from the schools of the county, attended the Ohio Wesleyan University at Delaware, Ohio, from which excellent institution he was graduated in 1870. This he followed with a course in law at Columbia Law School, Georgetown, D. C., being graduated from that school in 1875.

He early began to take an active part in politics, aligning himself with the Republican party, of which he has been a consistent life-long member. His ability as an organizer was recognized soon after he began to actively engage in party affairs and in 1876 he was made a member of the State Executive Committee. He was a member of that body for 28 consecutive years, serving four years as chairman and four years as secretary. He was chairman of the Kanawha County Executive Committee for eight years; of the Third Congressional District Executive Committee for ten; of the First District Committee for six, and was later a member of the National Republican Executive Committee.

He was appointed United States marshal for the District of West Virginia, and held the position for a number of years, administering the affairs of the office in a manner that called forth expressions of commendation and confidence from his superior officers in the Department of Justice. In 1888, having removed to Wheeling, he was nominated for Congress by the Republicans of the First Congressional District and was elected in November of that year. Being defeated for re-election, he devoted himself to the practice of law in Wheeling until 1896, when he became the nominee of his party for the office of Governor. He was elected in November, 1896, and inaugurated March 4, 1897, the first Republican to hold the office since 1871. The administration of Governor Atkinson was marked by a high degree of executive ability, and a continued strengthening of his party, which his retirement from office left free from factional differences and personal quarrels. This was largely due to his pleasant and agreeable personality, and the diplomatic methods which are natural with him. Possibly no other Governor of the State has ever left the executive office carrying with him in so great a degree the esteem of his party.

Shortly after his retirement from the office of Governor he was appointed United States District Attorney for the Southern District of West Virginia, and held that position until April, 1905, when President Roosevelt appointed him a member of the United States Court of Claims. This appointment being for life, Judge Atkinson has ceased his political activities so far as public participation in party affairs is concerned, but he is still deeply interested, as becomes a patriotic citizen of the Republic, and his counsel and advice are as eagerly sought as of yore.

In addition to his political activities, Judge Atkinson has found time during his busy life to achieve high rank in fraternal society matters. He became a member of the Masonic fraternity when a very young man, and is now one of the comparatively few members of the order who have attained to the Thirty-Third Degree. In 1876-7 he was Grand Master of the Grand Lodge of West Virginia, and was Grand Secretary from 1885 to 1905, a period of 20 years, during which time the affairs of the order were

well taken care of, while it enjoyed great growth and prosperity in the State. His connection with higher branches of the Masonic order has given him a wider acquaintance throughout the country than he would have secured otherwise, and in that way has greatly increased his influence in many directions.

He has been a member of the Methodist Episcopal Church since his early youth, and his long Church service and consistent life have given him wide influence with church people. He was a lay delegate to the general conference of the Church in 1876 and again in 1888. His religious views he has carried with him into other walks of life, and when a question of moral principle is involved with either a business or a political matter no man ever has to pause and ask where George Wesley Atkinson stands. He is always found on the side of good morals.

At the outset of his career, Judge Atkinson became interested in journalism, and for a number of years was connected in an editorial capacity with the West Virginia Journal, a newspaper of strong influence published in Charleston and the leading exponent of the principles of the Republican party in Southern West Virginia. Later he engaged in the newspaper business for a time in Wheeling, and there as in Charleston his strong, incisive editorial writings gained for his paper a powerful influence in the community.

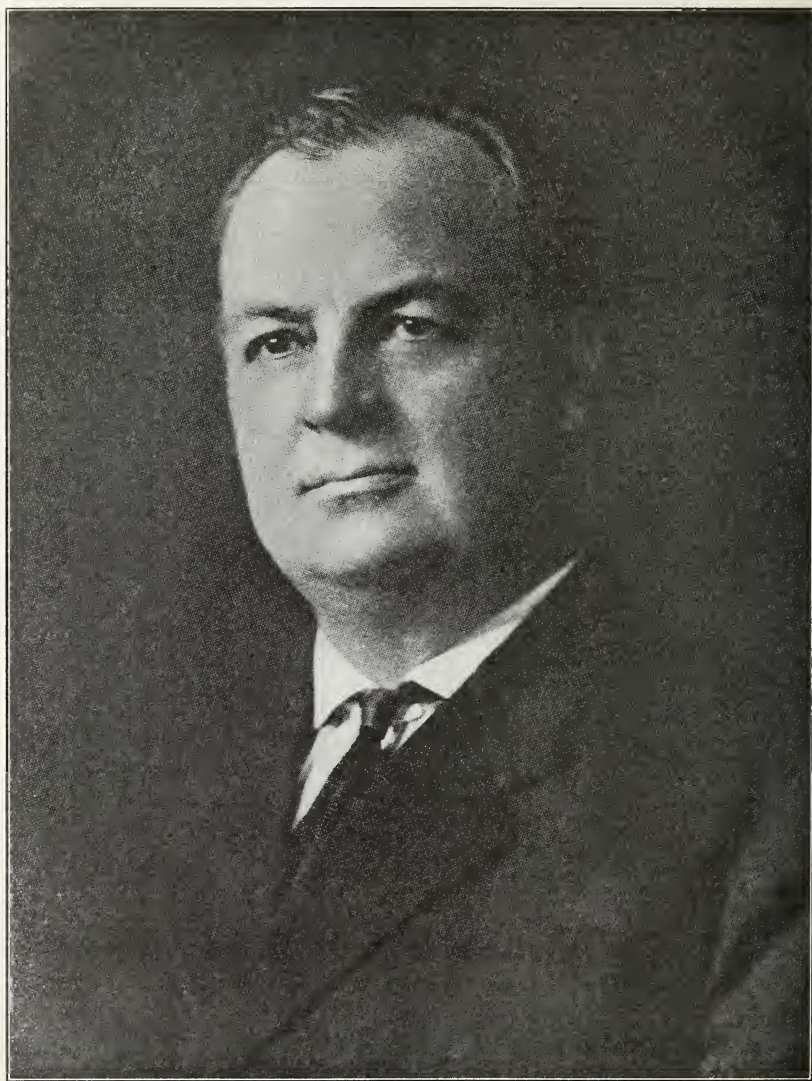
Judge Atkinson has always showed a strong literary bent, and in addition to his newspaper, legal, official and other work has written and published a number of books on various subjects. All his writings show deep study, and a firm grasp of public affairs.

Judge Atkinson has long held a prominent place among orators and public speakers in West Virginia, and his presence has been in demand at hundreds of meetings of many different kinds. Not only as a stumper of rare ability in political campaigns, but as a lecturer and platform speaker on a vast number of literary, religious and Masonic subjects has he made a reputation far wider than the limits of his native State.

In 1868 Judge Atkinson was married to Miss Ellen Eagan, member of a well known Kanawha county family. She died a number of years ago, leaving five children, who are all now living. In 1897 Judge Atkinson was married again, this time to Mrs. Myra Davis Camden, widow of the late Judge G. D. Camden, of Clarksburg. Judge and Mrs. Atkinson reside in Washington, where their home is the center of a social life that is both delightful and stimulating, filled as it is with an atmosphere of refinement and intellectuality, coupled with a gracious and generous hospitality.

While making his home in Washington, Judge Atkinson maintains his legal residence in Charleston, and there spends most of the vacation time allowed by his official duties. He has at Charleston two daughters and a number of grand children and to these he devotes such time as he may from the demands made upon him by myriad friends of his boyhood and early manhood, and the time thus spent amid the scenes of his youth and his early triumphs is to him the happiest of the passing years.

Kindly by nature, generous to a fault, true to his friends and his convictions, knowing no distinction in rank among men except that marked by character, George Wesley Atkinson is a fine type of the sturdy American boy grown by his own efforts into a man of influence among his own people and of usefulness to the State and nation.



HON. A. B. LITTLEPAGE.

Hon. Adam B. Littlepage.

Hon. Adam B. Littlepage, present member of Congress from the Third Congressional District of West Virginia, is a native of Kanawha county, where he was born April 14, 1859, the son of Adam and Rebecca T. (Wood) Littlepage. His early life was spent on a farm amid surroundings that would have thwarted the ambition of a less determined character. His father had met his death in 1862, and his mother, left with little property and a number of small children, could not give him the advantages of education that his mind craved and his ambition demanded. But what he lacked in opportunity he made up in application, taking from the public schools what they had to offer, and piecing it out with information gathered from reading, observation, and the great volume of learning called experience.

While still quite young he decided to become a lawyer, and for the greater opportunity it offered, went to Lodi, Indiana, to live with an uncle. There he worked and studied until the death of that relative, giving what time he could to reading the text books of the law. Upon the death of his uncle he spent some time in closing up the considerable estate left by him, and then, with that faith in himself and his powers that has always been one of his best assets, obtained admission to the bar at Newport, Indiana, and began the practice. The struggle for a livelihood was strenuous for a time, rendered more so by the fact that he accepted responsibilities all too frequently refused by other young men similarly placed, and assisted in the support of his mother's family at a time when he could do little more than support himself. The concrete illustration of this fact is that when making but fifty dollars a month he sent thirty-five dollars of the amount to his mother.

After three or four years of practice in Indiana, finding himself not in close touch with the people of that State, and feeling that a larger measure of success awaited him where he was better known and more in consonance with the people, he returned to West Virginia, and in Kanawha county, his birth place, and the home of his boyhood, permanently set his stakes and began patiently and diligently to work out his destiny.

In Kanawha county, among the people who knew and loved him, success was assured from the first, and clients began to seek his office in constantly increasing numbers. There was not much money in his early practice, for his kindness of heart and readiness to help those who came empty handed soon became known throughout the county, and the consequence was that for a good many years a vast proportion of the work he did brought in no revenue; but it enabled him to show the mettle that was in him and gave him the opportunity to prove his worth to clients who had money for fees and retainers, bringing him in these latter years a very lucrative business. In both the civil and the criminal practice he has demonstrated his ability in scores of important cases, and no lawyer at the Kanawha bar has in recent years appeared in court in a larger number of important causes. Part of the time he has practiced alone and part of the time as a partner of others. At present his firm is Littlepage, Littlepage & Littlepage, his son, S. Collett, and his nephew, R. Kemp Littlepage, being his associates.

Mr. Littlepage has for many years taken an active part in politics, being a loyal member of the Democratic party, and in every campaign being found on the firing line, where his eloquence and sincerity, coupled with his strong personal popularity and the people's confidence in his up-

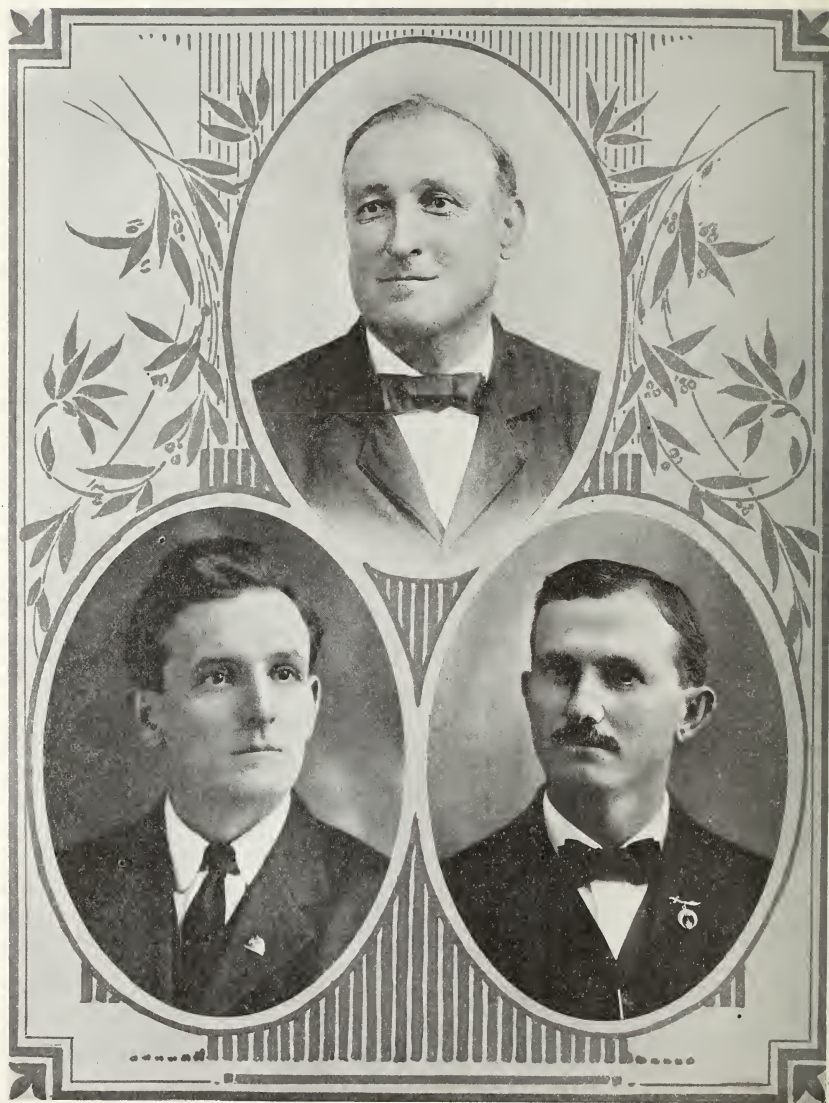
right character, have proved a tower of strength to his cause. On one occasion he was the nominee of his party for prosecuting attorney of Kanawha county, and although the remainder of Democratic ticket was beaten at the polls by various majorities, the first count showed a plurality against him of only forty-nine votes, and a recount resulted in a division of the office between him and his opponent.

In 1906 the Democrats of his district, believing there was a possibility of electing a member of the State Senate, in case they put up their strongest man, nominated Mr. Littlepage as their candidate. The district was normally about three thousand Republican, but undaunted by the odds that seemed overwhelming, Adam Littlepage went into the fight to win. He made a campaign such as the district had not theretofore known, going into every corner of it, meeting and talking to the people, personally and from the platform, and the consequence was his election by a majority so decisive as to be beyond dispute. He served the term of four years and refused a renomination.

In 1908 his friends talked of him as a candidate for Governor, and his name was, indeed, presented to the convention; but the nomination of another was a foregone conclusion, and Mr. Littlepage's brief candidacy was but an introduction to the State at large. Knowing his strength with the people, however, the leaders of the party forced upon him the nomination for Secretary of State. In that capacity he went over the entire State, making a campaign that won him friends by thousands, and made him a factor to be reckoned with in State politics.

In 1910 the convention to nominate a Democratic candidate for Congress in the Third West Virginia district met at Hinton. For ten years the nomination had been an empty honor, and nobody cared for a place on the ticket that seemed to mean only a hard fight with defeat at the end. Mr. Littlepage was not at the convention and so, after those named for the place had declined, one after the other, he was made the nominee and the convention adjourned without communicating the fact to him or getting his consent. His party's wish was to him a command, and so he accepted the nomination and began a campaign the like of which had not been witnessed in the district for years, if ever. He travelled the ten counties for weeks. He spoke day and night, in court houses, school houses, churches, halls and in the open air. He personally met and became acquainted with thousands of voters, with their wives and families, and made them all his friends. The consequence was his election by 1,866 in a district that was normally about 6,000 Republican. He took his seat in the National House of Representatives in March, 1911, and for two years made one of the most industrious, attentive and effective Representatives the State ever had in Washington. He was re-nominated by acclamation in 1912, but was defeated at the polls by a small plurality, though in the district the vote against the State ticket was very large. In 1914 his party again called on him to assume leadership in the district, and again he was elected, and will for the next two years give his people the same attentive, diligent service that characterized his former term.

Mr. Littlepage was married on April 8, 1884, to Miss Eva Collett, of Newport, Indiana, daughter of a well known family of Vermillion county. They have two children, Clara Frances, and S. Collett. At their beautiful home in the outskirts of Charleston they pursue a life ideal in simplicity and rich in hospitality.



HON. EDWARD COOPER.

JOHN COOPER.

THOMAS H. COOPER.

John Cooper, Pioneer Coal Operator.

John Cooper, pioneer coal operator in the Norfolk & Western field of Southern West Virginia, and father of Hon. Edward Cooper, of Bramwell, member of the National House of Representatives, was born in Dudley, England, November 14, 1842. On December 17, 1866, he married Maria Padbury, who was born in Dudley on December 10, 1845. Shortly after their marriage the young couple emigrated to America and located at Locust Gap, Pa., where their first son, Thomas Henry Cooper, was born on July 1, 1869.

On coming to America John Cooper engaged in coal mining, the business he had followed in England, and being a man of good business judgment, was quick to perceive the opportunities offered by West Virginia, then for the most part undeveloped. In 1871 he removed to West Virginia and worked at different times in the mines at Fire Creek, Quinimont, Hawks Nest and Caperton. It was in these mines he gained a knowledge of conditions in this State, thus fitting himself for more extended operations on his own account in the Pocahontas-Flat-Top region, which began a dozen years later. In 1883 he moved to his own property in Mercer county, and in the following year shipped the first car load of merchant coal from his Mill Creek mines. His knowledge of mining, combined with a strong grasp of general business conditions, enabled him to forecast the immense developments to follow in the section he had chosen for the seat of his operations, and he soon began to acquire and develop large bodies of coal producing lands. He was instrumental in opening up several of the largest operations in the Pocahontas field. No man did more for the development of Mercer county than did John Cooper during the period of his activities there. As a result of these activities great wealth poured in upon him and when his death occurred on December 6, 1899, he was reputed to be one of the wealthiest operators in the Norfolk & Western region. One of the striking features of his career as an employer of men was the uniform courtesy and kindness with which he treated all those whom he employed. Labor troubles were unknown at the Cooper operations, and it was not uncommon for miners to plan far ahead to secure employment there.

Thomas Henry Cooper.

Thomas Henry Cooper, who was born at Locust Gap, Pa., July 1, 1869, came to West Virginia with his parents in 1871. At the age of seven he was placed in a mine as braker boy, and being thus employed until he was fifteen, he gained a practical knowledge of mining. In 1884 he entered Roanoke College at Salem, Va., completing his course there in five years. In 1889 he became assistant to his father in the management of the Mill Creek Coal & Coke Company. Four years later he became manager of the McDowell Coal & Coke Company, and when his father died, in 1899, assumed control of all the operations controlled by the Cooper family, which he ably managed until the time of his death, March 23, 1911.

While attending Roanoke College he was converted to the Methodist faith under the preaching of Bishop Collins Denny, and for the remainder of his life entertained deep religious convictions. On June 6, 1893, he married Mary Etta Busey Barnitz, daughter of Judge William Barnitz,

of Salem, and to this union eight children were born, five of whom are living. In 1904 he completed a palatial residence in Salem, and resided there until the time of his death. He was public spirited, broad minded and generous, and his sound business judgment easily marked him as a leader. He was president of the Colonial Bank and Trust Company of Roanoke from its organization to the time of his death; president and largest owner of the Cooper Silica Glass Company of Salem; a stock holder and director in the Bank of Salem; and a stock holder in the Farmers National Bank of Salem.

During his life Mr. Cooper became a fraternalist of high degree and reached high rank in the order of Free Masonry. He was Past Master of the Bramwell Lodge of Masons, a member of Ivanhoe Commandery Knights Templar and of Beni Kedem Temple of Shriners at Charleston.

Edward Cooper.

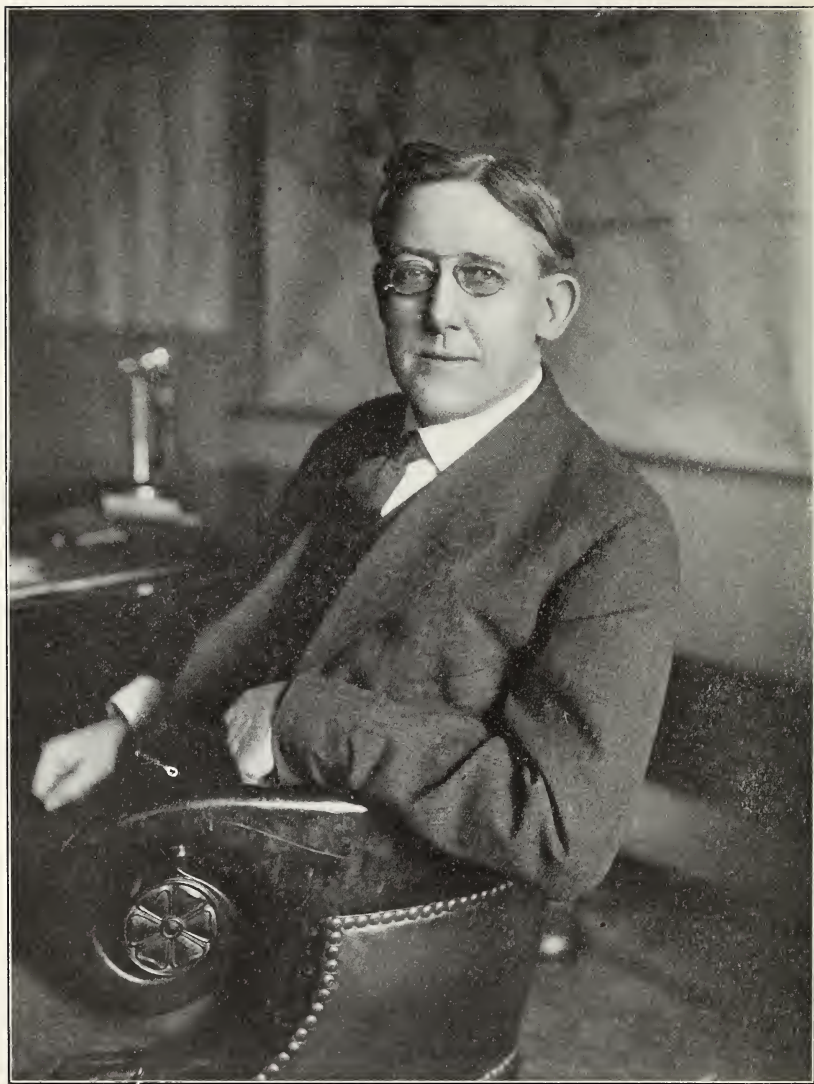
From trapper boy in a coal mine to a seat in the Congress of the United States is a long step, but that it is possible of being made is demonstrated in the life of Edward Cooper, of Bramwell, who on November 6, 1914, was elected to that position from the Fifth West Virginia district. Born February 26, 1873, he was 42 years and six days old when he became a member of the Nation's law-making body.

He was the second son of John and Maria Cooper, and his father being a miner by occupation, he began life as a trapper boy. His "aim in life" was to be a successful lawyer and he attended school at Washington & Lee University, where he received his degree. For several years he practiced his profession, but on the death of his father in 1899 he became actively identified with the production of coal in the Norfolk & Western field, and under his management and supervision the companies in which he is interested have become potent factors in the development of the New River and Pocahontas regions.

Mr. Cooper began at an early age to take an active interest in politics, allying himself with the republican party, of which he has been a useful and influential member. Having an ambition to represent his district in Congress, Mr. Cooper became a candidate in 1914, and was nominated overwhelmingly in the primary. In the November election he defeated his democratic opponent by a large majority.

Mr. Cooper was married October 1, 1895, to Miss Frances D. Smith, and is the father of two children. He resides with his family at Bramwell. From the death of his brother in 1911 he has been manager of the Cooper mining interests, and his success in business is of the history of the State. He pursues the policy of considerate treatment of employees that marked his father's career, and with the same result—the good will of all who work in the mines under his management.

Other members of John Cooper's family who still survive are his widow, Maria (Padbury) Cooper, who lives with her son at Bramwell; and five daughters—Annie, wife of Col. W. H. Thomas, Bramwell; Mary, wife of James R. Shanklin, Bramwell; Sallie, wife of C. R. Brown, Tazewell, Va.; Emma, wife of D. H. Thomas, Columbus, Ohio; Katie, wife of James F. Brophy, Red Lodge, Mont.



HON. W. E. CHILTON.

Hon. William E. Chilton.

Among the native sons of West Virginia now living the most commanding figure from a national point of view is the Hon. William E. Chilton, the State's senior member of the United States Senate. Going to that body at a time when many momentous questions were at issue in Congress, he at once took place among the leaders on the Democratic side, and his voice has been potent and his influence great in their consideration and disposition. The reasons for this are plain. He carried to the Senate a mind naturally strongly analytical, well versed in the law and thoroughly trained by hard study and deep thought to engage in the solution of big problems, coupled with a strong natural bent for political affairs, and an unconquerable ambition to succeed in all his undertakings.

William Edwin Chilton was born on a Kanawha county farm near the town of St. Albans on March 17, 1858, the son of William E. and Mary E. (Wilson) Chilton. Most of his early boyhood was spent in farm life, and he attended the public schools, a portion of the time in the city of Charleston and the remainder in the rural districts. After leaving the public schools he continued his studies for a time at Shelton College, St. Albans, then under the management of Professor Reynolds, an able and distinguished educator of that day. Here he engaged in tutoring, in addition to his work as a student, and when he left the school it was with an education far better than that received by the average young man who goes through a college of much higher grade. Upon leaving Shelton College he engaged in teaching in Kanawha and Lincoln counties for several years, during which time he gave his spare moments to study of the text books of the law. By the time he had reached his majority he had, without tutelage of any kind, so mastered the principles of the law that he easily passed the required examinations, received his license as an attorney and was admitted to the bar. Soon after he began the practice he formed a partnership with the late John E. Kenna, then United States Senator from West Virginia, which partnership was dissolved by the death of Senator Kenna in 1893. Later he became associated with his brother, Hon. Joseph E. Chilton, and former Governor William A. MacCorkle in the firm of Chilton, MacCorkle & Chilton, which has been for almost twenty years one of the foremost legal firms in the State.

At a very early age Mr. Chilton became deeply interested in politics, as a Democrat, and had done his party considerable service before he was old enough to vote. In 1883 he was appointed prosecuting attorney of Kanawha county to fill out the unexpired term of Hon. C. P. Snyder, elected in that year to the House of Representatives of Congress. He made an excellent record in the office for a year and a half, discharging its duties with ability and industry. He was nominated in 1884 for the full term, but was defeated in the wave of Greenback-Laborism which swept over Kanawha county that year, submerging the Democratic party at the polls. In 1886 he was nominated for the State Senate in the Kanawha district, and was defeated by a small plurality, although the district gave a very decided opposition majority.

In 1893, by a superbly organized and skillfully managed campaign, he brought about the nomination for Governor of William A. MacCorkle, and was made chairman of the Democratic State Committee charged with the management of the party campaign of that year. That campaign

stands to the present day as the most thoroughly organized and best conducted ever waged by the Democratic party in the State. Although the Democratic candidate for Governor four years before had won by a plurality so close as to leave the result in doubt for months, under Chairman Chilton's intrepid leadership MacCorkle was elected by something like five thousand votes over his Republican opponent, carrying with him the full State ticket. Upon assuming the executive office Governor MacCorkle made Mr. Chilton Secretary of State, and for four years he administered the affairs of that office with the ability and industry that have distinguished his entire professional and political career. Upon retiring from the office of Secretary of State in 1897, Mr. Chilton resumed the practice of his profession, devoting himself to his work with characteristic energy and ability, the result being shown in the accumulation of a clientele not surpassed by that of any other firm in West Virginia. Not only has his firm been retained by a number of the large corporations doing business in the State, but its general practice among firms and individuals of all classes grew to be very large, so that his professional life came to be an extremely busy one.

Having lived all his life in West Virginia, and knowing the natural resources of the State as few men have come to know them, Mr. Chilton naturally became interested in many plans for their development, and, through his wide acquaintance with men of affairs in other communities, has been instrumental in bringing a large amount of capital and many enterprising men into the State, to add to its wealth and aid in its progress. A number of railroad enterprises, mining operations and manufacturing plants of considerable magnitude now being operated in West Virginia are directly due to the intelligent efforts of Mr. Chilton and his two law partners, who have been interested with him in practically all his financial and industrial undertakings. The city of Charleston and the Great Kanawha Valley have especially benefited largely from the efforts of these gentlemen to attract men of capital and enterprise.

When West Virginia was swept into the Democratic column by the tidal wave of 1910, and the Democrats began to look about among their number for a fit man to elect to the United States Senate as a successor to Hon. N. B. Scott, whose term was about to expire, attention was immediately riveted to William Edwin Chilton, and when, a few weeks after the November election, the death of Senator Stephen B. Elkins created the second vacancy to be filled, it became a foregone conclusion that no matter who might be chosen to one, Mr. Chilton would be named to fill the other seat. In January, 1911, he was nominated by the Democratic caucus and elected by the Legislature to the Scott succession for the full six years, and in the special session of Congress called for the early spring of that year took his seat as a Senator of the United States. In the busy sessions of Congress which have followed—sessions that have in some respects made a new record in national legislation—Senator Chilton has borne a useful, active and conspicuous part. He was made a member of the Judiciary Committee, and soon began to attract the attention of the country by his industry and ability. He became chairman of the Committee on the Census, and has performed the duties of the position with intelligence and dispatch. He is a member of the Senate

Committee on Printing, and of the Joint Committee on Printing, which latter body controls the purchase of all the printing and stationery supplies of both houses of Congress. He is a member of the Committee on Naval Affairs, the Committee on Inter-Oceanic Canals, and a number of others of less magnitude and importance. When it was decided to raise a Committee to consider the relations between the District of Columbia and the general government with respect to taxation, and the names of Democratic Senators began to be considered in connection with the chairmanship, Senator Chilton was almost immediately hit upon as being the man best adapted by habits of thorough investigation and hard work for the place. He was therefore appointed, and his management of the work of the Committee as far as it has gone has fully demonstrated the wisdom of his selection. The matter which this Committee was created to consider has been under consideration and discussion for a hundred years, but now seems in a fair way to be settled, and that largely through the intelligent treatment and tireless industry of the Committee chairman.

When the famous Clayton Bill had been passed by the House of Representatives and was sent to the Senate for consideration it became necessary, owing to the illness of Senator Charles A. Culberson, of Texas, chairman of the Judiciary Committee, to choose some other member from among the friends of the measure to manage its course through the Senate. The choice of the Democratic members of the Judiciary Committee was Senator Chilton, and the bill was given into his hands. His conduct of the fight which eventuated in its final passage by the Senate was one of the features of the session, and marked him as a man of ability and resourcefulness in parliamentary matters, as well as a lawyer of ability and erudition.

In the consideration of the tariff bills, the Panama Canal tolls measures, the naval appropriations, amendments to the anti-trust laws, and various other important questions that have been dealt with since he became a member of the national legislative body, Senator Chilton has borne a conspicuous part, proving in all a man devoted to the best interests of his country, and a tower of strength to his party. His counsel and advice are sought on all questions of moment, and no Senator stands higher than he with the titular leaders of the Democratic party.

At the present time, in addition to the other work devolving upon him as a member of the Senate, Senator Chilton is engaged in an attempt to secure the passage of an act that will permit the original Thirteen States to bring suit against the general government for the recovery of money due them on account of the cession of the Northwest Territory. Those conversant with the history of the country will remember that a large portion of the territory of the United States as now constituted, lying west of the Ohio river, was ceded to the general government by the State of Virginia. This vast expanse of land was later divided into Territories, which still later became States of the Union. Senator Chilton's contention is that this immense territory belonged to the original Thirteen States, and that when it was given over to the making of other States the act carried with it the responsibility of paying for it. He therefore asks that the right to sue be granted the original States, to the end that the matter may be adjudicated and the money due, if any shall be found to be due, may be paid over.

The question raised by Senator Chilton has created widespread interest, and is being discussed throughout the length and breadth of the country. It is of peculiar interest in West Virginia, for two reasons. In the first place it has been raised by a West Virginia Senator, and in the second place it seems to offer the solution of another problem which is of vital moment to this State. That problem is the payment of the twelve million dollar judgment against West Virginia recently entered in the Supreme Court of the United States in the case of State of Virginia against the State of West Virginia. The payment of such a sum of money as would be involved in a judgment against the general government such as Senator Chilton believes would be secured were the suit in question authorized, would bring to West Virginia a share ample to wipe out the judgment now standing against it on the records of the country's highest court.

In his personal relations Senator Chilton is one of the most widely popular men of the State, and his friends are legion. His reading has been so extensive that there are few questions which he cannot discuss with ease and intelligence. He is a raconteur of famous powers, and his fund of stories and anecdotes seem inexhaustible, making him one of the most entertaining conversationalists to be met with anywhere. He is a musician of more than ordinary skill and his ability to play the violin has brought him into great demand at social functions both at his home in Charleston and in Washington. It has been the cause, indeed, of the organization of a society of "addlers" in the Senatorial circle in the latter city.

He is an orator of a high order of ability, strong, eloquent, ironic, witty, humorous, able to sweep the full gamut of human emotions, "from the grave to gay, from lively to severe." During the vacations of Congress his time is largely taken up with the delivery of speeches and addresses made in obedience to the invitations and demands of schools, societies and various gatherings throughout the State, and his popularity as a speaker and as a man assures him of a large audience wherever he appears.

Senator Chilton was married in 1892 to Miss Mary Louise Tarr, a young woman known to society throughout the State and in Washington for her great personal beauty and her many graces of mind and character. They have four children: William Edwin, Jr., now in college; Joseph Eustace, still in school; Eleanor Carroll, and Elizabeth, both attending schools for young women. They have a beautiful home in Charleston, where a generous hospitality is dispensed, and from whose doors no worthy indigence is ever turned away empty handed.

Senator Chilton has three brothers living, Joseph Eustace, who is a member of the firm of Chilton, MacCorkle & Chilton, and who has long ranked among the leading lawyers and public men of West Virginia; George O., well known as an oil and gas producer and general promoter, and John Savary, who is a chemist and pharmacist by profession, but who has latterly given most of his time to the study of scientific agriculture. The eldest brother of the family, Samuel B., died in 1893. He was a physician and surgeon of deep learning and rare skill, of whom great things were expected in his profession by those who knew him.

The father of this strong and interesting family died in 1883, but the mother still lives, and at her home in Charleston, in her serene old age, enjoys the near-idolatry of her four stalwart sons, and the love and esteem of a circle of friends whose name is legion living throughout the length and breadth of the country.



HON E. R. ENGLAND,
President West Virginia Senate.



GEN. N. S. BURLEW.

General N. S. Burlew.

An excellent illustration of the opportunities which West Virginia offers to men of ambition and ability is presented in the career of General N. S. Burlew, of Charleston, for years a leading business man of his community, twice appointed Adjutant-General of the State, and one of the Capital City's most useful and progressive citizens.

Noyes Stephen Burlew was born on a farm near Sheldrake, Seneca county, New York, in 1848; his parents being James A. and Sophia (Wood) Burlew, natives of New Jersey and of French stock. When the civil war broke out in 1861 young Burlew, at the age of thirteen, enlisted in the 126th Regiment, New York Volunteers, and saw service in some of the principal battles of the war, including that of Gettysburg. After the war he returned home and stayed on the farm until he was 21. He received his education in the local schools and at Cazenova College, and for several years practiced dentistry at Ovid and other places in his native State.

In 1872 he came to Charleston and for two years engaged in the lumber business, being then appointed a deputy revenue collector, a position which he resigned in 1876 to enter the hardware business. In that business he has been ever since, from a small beginning having built up an establishment that in point of size and solidity ranks with the best of its kind in the State. From his store and numerous other enterprises in which he has engaged from time to time, General Burlew has amassed a very considerable property, the income from which renders him free from the necessity of financial worry.

Having been all his life interested in musical and dramatic work, it was natural that he should drift into the theatrical business, which he did in the early eighties, when with E. L. Boggs he became joint lessee and manager of the Cotton Opera House, Charleston's only theater of that day. In 1891 he organized a company and built the handsome Burlew Opera House, of which he has been manager ever since, and of which he is now sole owner.

He has for years been a constant student of Shakespeare and as an amateur has successfully portrayed a number of that master-author's leading roles. Even now he keeps up the study and the voice-culture of other years, and is in frequent demand for dramatic readings.

General Burlew has always been a lover of horses, and has at various times owned and developed the following well known trotters: Belle Clinton, Norwood, White Foot, Arrow, Mikado, Pearl McGregor, Virginia West, Charlie Watts and Hermione B., the last named, still his property, being now a very fast 2-year-old trotter. While the care and training of horses has been with him a diversion it has happened that he has also made them profitable, some of the animals mentioned above having brought him big prices.

When Hon. G. W. Atkinson became Governor of West Virginia, in 1897, he made Mr. Burlew a colonel on his staff, and he has served in the military establishment of every Governor of West Virginia since. He was a brigadier-general under Governor White from 1901 to 1905; Governor Dawson appointed him adjutant-general of the State, and Governor Glasscock in 1909 reappointed him to the same position, which he held until 1910 and then

resigned. He is now a brigadier-general on Governor Hatfield's staff. He is the only man in West Virginia who has the distinction of having served on the staffs of five Governors.

In 1901 General Burlew became president of the Mail Publishing Company and for seven years was a potent factor in the control of the Charleston Daily Mail. He has engaged in a number of other enterprises of a quasi public character, and has in addition been prominent in the promotion of many of a purely business character.

When a very young man he was initiated into the mysteries of the Masonic fraternity, and has been a faithful member ever since, having held practically all the offices in the various lodges through which he has passed. He is Past Master of Union Lodge No. 114, Ovid, N. Y., Past Eminent Commander of Kanawha Commandery No. 4, Knights Templars, Past Potentate of Beni Kedem, Nobles of the Mystic Shrine, and has served the Temple as High Priest and Prophet for twelve years.

While General Burlew has never been a candidate for political office, he has always taken a keen interest in party affairs, and his advice has been sought by many of those who were ambitious of serving the people in public places. Having espoused the principles of the Republican party early in life, he has been their consistent supporter at all times, though he has shown his independence of thought and action on numerous occasions by refusing to support the nominees of his party when he thought them unworthy or lacking in ability.

In 1883 General Burlew was married to Miss Elizabeth Rand, daughter of one of the oldest and most widely known families in the Kanawha Valley, and herself widely known for her many charms of mind and character. They have a beautiful home in Charleston, where is dispensed an old fashioned hospitality that is as generous as it is unostentatious. It is the old home of Mrs. Burlew's family, a stately mansion of colonial design that commands attention by reason of its contrast with the beautiful modern homes for which the city is noted, and in contrast and comparison with which it loses nothing.

Having come to Charleston when it was little more than a village, and having witnessed its growth to its present splendid proportions, a growth which he long ago foresaw, and which he has done much to encourage, General Burlew takes great interest in municipal matters, and feels much pride in the city's progress. His faith in Charleston's growth was evidenced by his numerous investments in Charleston property, and has been vindicated by the profits they have brought him. Though not taking the active part in business he once did, the hustling qualities that carried him to success have never left him, and some portion of each business day finds him at the hardware establishment founded and built up by him, giving counsel and advice to the younger men upon whom its active management now devolves.

Affable with all with whom he comes in contact, loyal to his friends, charitable without ostentation, generous to the limit of good judgment, and strictly honorable in his dealings with all mankind, General Noyes Stephen Burlew typifies the high quality of citizenship that has made West Virginia one of the foremost of the country's commonwealths.



HON. M. P. SHAWKEY.

Hon. M. P. Shawkey, State Superintendent of Schools.

Morris Purdy Shawkey, State Superintendent of Free Schools of West Virginia, was born at Sigel, Jefferson county, Pa., February 17, 1868, the son of George and Annie Elizabeth (Witherspoon) Shawkey. He attended the public schools and then went for a time to Oberlin College, after which he went to Ohio Wesleyan University, from which he was graduated in 1894. In 1913 his alma mater conferred upon him the degree of Master of Arts.

He began his career as a school man immediately after quitting college and has followed it with ambition and diligence ever since. He served a year as superintendent of the schools of Reynolds, N. D., and then became a member of the faculty of Wesleyan College at Buckhannon, W. Va. He came to Charleston in 1897 as chief clerk in the office of the State Superintendent of Schools, a position he held for eight years. He was elected a member of the House of Delegates from Kanawha county in 1902, and during the session of 1903 was chairman of the committee on education, and a valuable member of the body along many lines. He was county superintendent of schools of Kanawha county for a term.

He was elected to the office he now holds in 1908 and re-elected in 1912.

In 1902 Mr. Shawkey was united in marriage with Miss Elizabeth L. Carver, daughter of John Carver, a prominent coal operator of the Kanawha field.

Hon. H. E. Williams, Commissioner of Agriculture.

Howard E. Williams, Commissioner of Agriculture of West Virginia, was born at Blue Sulphur Springs, in Greenbrier county, June 10, 1875. His parents were A. G. and Elizabeth (Donnelly) Williams. When he was two years old his parents moved back into the mountains of Big Clear creek, and there he lived until his father's death in 1894. He was educated at Wesleyan College at Buckhannon and the West Virginia University, being at the former school 1894-99 and at the latter 1900-02.

He specialized in agriculture while at the University, and was appointed director of Farmers' Institute for 1905 and 1906. He was appointed State Highway Inspector in 1906 and served two years.

In 1912 he was elected Commissioner of Agriculture, being first to serve the newly created office.

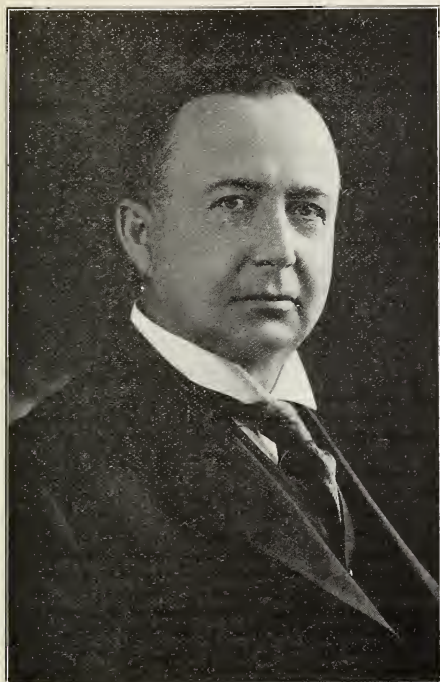
Having been a farmer and cattle raiser all his life he takes a deep interest in every phase of the agricultural industry, and the management of the affairs of his office is marked by the application of industry and intelligence.

During the recent unfortunate visitation of the foot and mouth disease to this State Commissioner Williams had to call to his assistance all the resources of firmness and diplomacy of his character to save the farmers from great loss. He was successful in meeting the issue and has strongly fortified himself with the agricultural interests of the State by the manner in which he handled it.

Mr. Williams was married on December 26, 1912, to Miss Lillian Margery Wright, of Buckhannon.



HON. H. E. WILLIAMS.



Hon. J. S. Darst,
Auditor.

John Sherman Darst, present Auditor of West Virginia, and a potential candidate for Governor before the Republican primaries of 1916, was born in Gallia county, Ohio, in 1860. After he finished his schooling in the public schools, he learned the miller's trade, which he followed for a number of years in his native State, and in Jackson county, West Virginia, after his removal to this State. He was elected to the House of Delegates by the Republicans of Jackson county in 1896, and re-elected for the two succeeding terms. In 1902 he was sent to the Senate, where he served for four years, being an active factor in the passage of the new system of taxation under which West Virginia is making such rapid progress. He was patron also of the constitutional amendment that took the fees away from the Auditor and Secretary of State and put both on a salary basis. He introduced and pressed 'o passage other important measures on various subjects. He was assistant Tax Commissioner for several years, and was elected auditor in 1908, and re-elected in 1912.

He married Miss Blanche McKay, of Gallia county, and they have three children, Lieutenant Guilford Darst, of the United States Navy; Helen, wife of Frank Corbin, of Morgantown; Moses, now living with his parents at Charleston.

Hon. A. A. Lilly, Attorney General.

Armistead Abraham Lilly, Attorney General of West Virginia, was born in Summers county on March 25, 1878. His parents moved to Raleigh county while he was very young, and there he attended the public schools, and afterwards went to the High School at Bluefield. Later he attended the Southern Normal University at Huntington, Tennessee, of which school he is now an LL. B. He studied law and was admitted to the bar in 1900, and the same year was elected to the legislature from Raleigh county. In 1904 he was elected to the office of Prosecuting Attorney of Raleigh county, and in 1908 was one of the Presidential Electors who cast the vote of the State for Hon. William H. Taft. In 1910 he sought the Republican nomination for Congress in the Fifth District, making a campaign which, while not successful in bringing him the honor he sought, gave him a State-wide reputation and made him a factor to be reckoned with in future. In 1912 he was nominated for Attorney General, and in the election of that year received the highest number of votes of any State candidate.

As Attorney General he has had many questions of great importance to deal with, among them the Virginia debt case, the railroad rate cases and the cases growing out of charges of bribery brought against members of the legislature. In all these he has shown marked ability and excellent legal generalship.

General Lilly is married and is the father of one daughter and two sons.



HON. A. A. LILLY

Henry Drury Hatfield

In the life of none other of its sons is the opportunity which West Virginia offers for success to those possessed of ability, industry and ambition better illustrated than in that of Henry Drury Hatfield, the present Governor. Others have achieved success by their own unaided efforts, but no other from such humble beginning has within the short span of a young man's life climbed so high.

Henry Drury Hatfield was born on a farm on Mate creek, in Logan county, West Virginia, September 15, 1875, the son of Elias and Elizabeth (Chafins) Hatfield, and received the rudiments of education in the country schools. Later he studied at New Athens, Ohio, at Franklin College, and in 1893 was matriculated at Louisville University, Louisville, Kentucky. In 1903 he went to New York University, New York City, and later to New York Polytechnic Post Graduate Medical School, New York City, and Cornell University. Since finishing at the last three schools he has returned to them for post graduate work on numerous occasions.

Upon securing his diploma as physician and surgeon Dr. Hatfield returned to his native State and began the practice in the coal fields of the Norfolk & Western region, finally making his home at Eckman, in McDowell county. He soon began to show signs of a remarkable ability as a physician, and more especially as a surgeon, and within a few years became one of the chief surgeons of the Norfolk & Western railway, and of a number of large mining operations.

Dr. Hatfield's first public position was that of member and President of the Board of Directors of West Virginia Miners' Hospital No. 1 at Welch, in which position he showed marked executive ability.

In politics he espoused the principles of the Republican party, and in 1907 was elected a member of the county court of McDowell. In 1908 he was sent to the State Senate, and in that body was an invaluable member of the finance committee. At the legislative session of 1911, when the membership of the Senate was evenly divided between Republicans and Democrats, Senator Hatfield was chosen President of the body, by a combination of Republican and Democratic votes.

The ability he displayed in State affairs brought him forward as a candidate for Governor in 1912, and he was nominated. His Democratic opponent was William R. Thompson, of Huntington, over whom he was elected by more than eight thousand votes. He was inaugurated Governor on March 4, 1913.

No other Governor of West Virginia ever assumed the duties of the office to find such weighty problems so immediately pressing. Differences between the coal operators and miners in some of the coal fields had brought about a condition that caused martial law to be declared on Cabin creek and Paint creek, and had turned the mining villages into armed camps. Clashes between soldiers and strikers had occurred, and a number of people had been killed. Governor Hatfield went to work to bring about a settlement. He did not sit in his office and send others to learn the true state of affairs and tell him what to do, but made personal investigation and based his action upon what he thus learned. The consequence was that he brought about a settlement of the difficulty within a short time, since when peace has reigned where disorder was rampant.

Another vast problem that confronted Governor Hatfield at the threshold of the executive office was the suit be-

tween Virginia and West Virginia pending in the Supreme Court of the United States, by which the former sought to secure payment of millions of dollars alleged to be due by reason of the debt existing against the parent State at the time of the division. The Master in Chancery had already reported \$7,182,507.46 as the amount due with interest and the finding awaited the proper time to be crystallized into a judgment. After careful investigation Governor Hatfield decided the case had not been properly presented on West Virginia's behalf, in that no offsets had been urged for assets in which the State was, in his view, entitled to share. Against the advice of many lawyers to whom he presented his views, Governor Hatfield decided to ask for a re-opening of the case. He employed accountants to list the credits to which he claimed his State was entitled and counsel to present the figures to the Supreme Court and ask for a rehearing. The case was presented, the rehearing granted, and \$2,966,885.18 in credits allowed. While the judgment finally entered against West Virginia was for a total of \$12,393,929.50, but for the reopening of the case it would have been for \$9,000,000 more, including interest.

When the legislature met in January, 1915, Governor Hatfield found himself facing another serious problem. Owing to the extra expense of keeping troops in the field for months during the coal strike, and to the fact that an amendment to the constitution had prohibited the granting of licenses to sell alcoholic liquors from July 1, 1914, thereby causing the loss of some \$600,000 revenue, there was a large deficit in the State treasury. Governor Hatfield in a number of messages presented these matters to the legislature, and suggested means by which sufficient revenue could be raised without a large increase in the direct levy. Some of the plans proposed were a tax on the production of coal, oil and gas, a tax on the incomes of corporations and an increase in the license taxes of corporations. During the regular session and a special session lasting fifteen days these matters were considered and defeated, and the legislature adjourned finally without having provided the necessary revenue. Undaunted by the adverse action of the law-making body Governor Hatfield at once began a campaign among the people with the object to cause public sentiment to force the passage of the proper revenue measures. So successful was he that within two months of the former adjournment the legislature, called together in special session, enacted the laws he advocated and brought relief to the treasury, without unduly burdening by direct taxation the large body of the people.

Governor Hatfield is a man of family, having married in 1896 Miss Carrie Bronson, and having one daughter, Miss Hazel, now just budding into womanhood, and in the mansion which the State provides for the occupancy of its chief executive, dispenses a hospitality as cordial and spontaneous as it is generous. He and his family have become great favorites in the society of the Capital City, and are welcomed as guests at many social functions.

This is the record of a West Virginian, achieved by his own efforts, among his own people, before he has reached the age of forty years. What the future holds for him the future alone can disclose. The chief characteristics of Henry Drury Hatfield—readiness to accept responsibility, unswerving devotion to duty, and indomitable courage in the face of difficulties—dominated by a proper and laudable ambition, illimitably widen the circle of his opportunities.



HON. H. D. HATFIELD,
Governor.

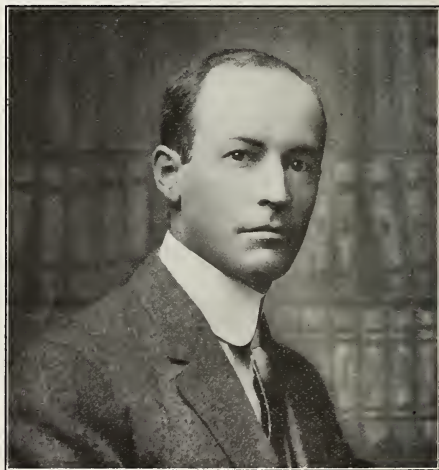
Hon. E. L. Long, Treasurer.

E. Leslie Long, the present treasurer of the State of West Virginia, was born at Alma, Tyler county, West Virginia, the son of L. H. and Martha A. Long. He attended the public schools in Tyler county and was graduated from Wesleyan College at Buckhannon with the class of 1898. He then took the law course in the West Virginia University, from which he was graduated in 1901, and being admitted to the bar the same year, began the practice of his profession at Welch, McDowell county.

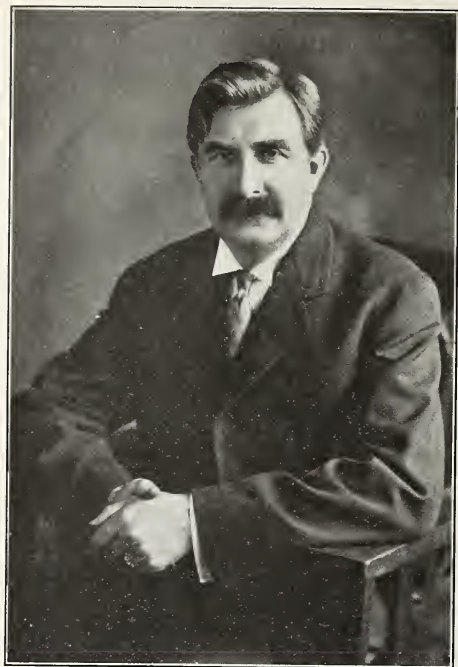
He early became interested in politics as a member of the Republican party, and has been a member of every State convention of that party since 1896. In 1908 he was nominated for State treasurer by the Republican convention which met in Charleston, and was elected in November of that year. He was renominated in the State-wide primary of June, 1912, and re-elected in the following November, receiving the largest majority of any candidate on the ticket.

Mr. Long is a member of the Masonic order, his membership being in McDowell Lodge No. 112 at Welch. He is also a member of the West Virginia Consistory at Wheeling and of Beni-Kedem Temple of Shriners at Charleston. At college he was a member of the Phi Kappa Psi fraternity.

Though one of the youngest members of a State administration in which young men predominate, Mr. Long has achieved a large measure of success, having been well known and largely employed as an attorney before he entered office. In the management of the treasurer's office he has been careful and conservative, and the finances of the State have been cared for with signal ability. The books of the office are well kept and everything about it runs with the utmost smoothness.



HON. E. L. LONG.

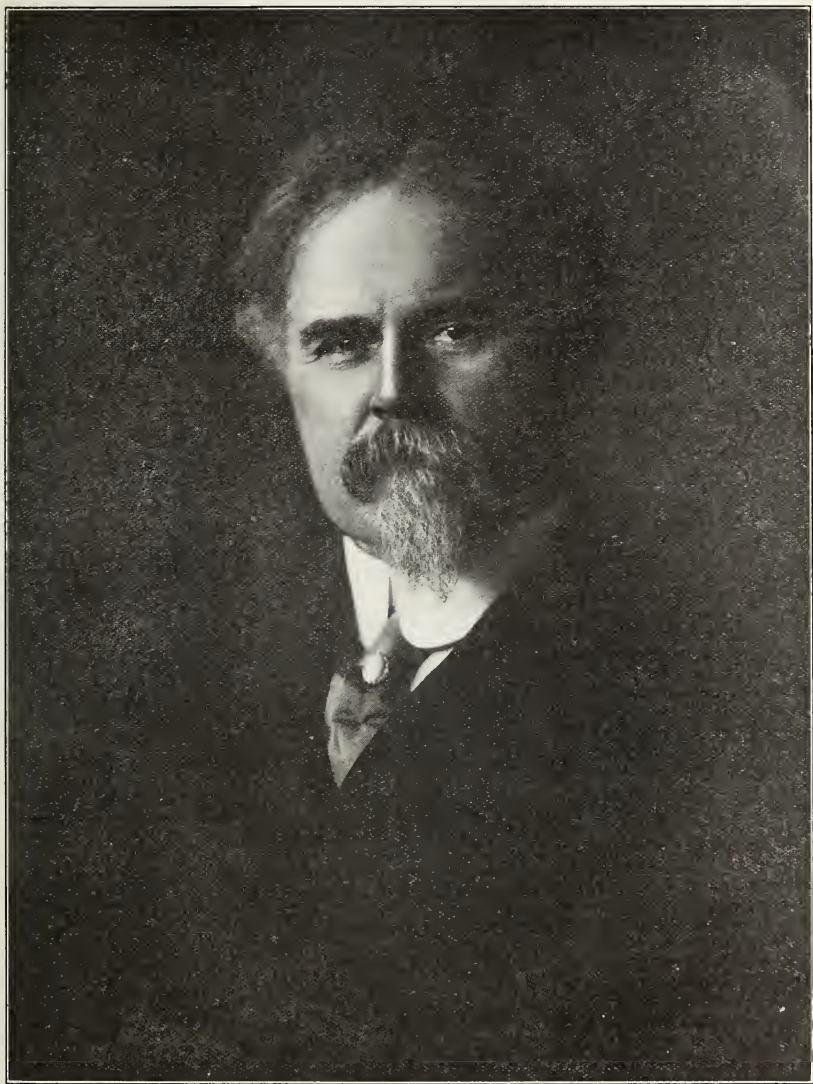


Hon. Stuart F. Reed, Secretary of State.

The present Secretary of State, Hon. Stuart F. Reed, was born and reared on a farm in the Elk Valley, in Barbour county. Though working hard in the daily routine of farm life, he early acquired a taste for reading and study, and became an apt pupil in the public schools of the countryside. At the age of sixteen he passed the examination for teachers and, receiving a No. 1 certificate, began teaching school. Later he attended the Normal School at Fairmont for parts of two sessions, and received a full-course diploma. He then entered the West Virginia University, where he pursued his studies for three years, and from which he received the degree of LL. B. In 1891 Mr. Reed, General Goff and others purchased the Clarksburg Telegram, of which he became managing editor, and for a number of years he gave his entire attention to journalism, a profession in which he soon took high rank. He was elected to the State Senate in 1895, being the youngest member of that body. He was one of the founders of the National Republican Editorial Association, and helped to draft its constitution.

Mr. Reed was elected Secretary of State in 1908 and re-elected in 1912. He is now generally spoken of as a proper man for the Republicans to nominate for Congress in the new Third district.

Mr. Reed was married on June 16, 1898, to Miss Bonnie Belle Smith, of Clarksburg, West Virginia.



HON. W. A. MacCORKLE,
Governor of West Virginia from 1893 to 1897.

HON. WELLS GOODYKOONTZ

Senator from Mingo.



HON. JAMES A. STROTHER

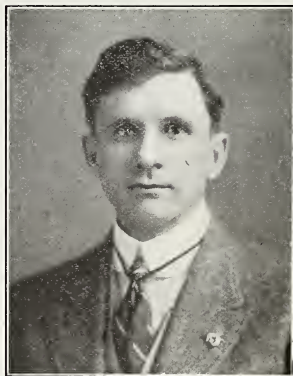
Senator from McDowell.

James Alexander Strother, member of the West Virginia Senate from McDowell county, was born in Culpeper county, Virginia, January 13, 1870, and was educated in the public schools of that county. After finishing his school course he decided to enter the law as a profession, and began the study under the tutelage of John L. Jeffries, of Culpeper, one of the leading lawyers of the State. He also took a short course at the University. While studying law he taught school, thus broadening his education and acquiring experience that has been valuable to him in his life work. He was admitted to the bar as soon as he attained his majority, and at once began the practice at Welch, McDowell county, West Virginia. He soon took a high place among the people of that section, both as a lawyer and a citizen, and was mayor of the town of Welch for ten years—1896 to 1906. He was elected to the House of Delegates of the West Virginia Legislature in 1906, and re-elected in 1908 and 1910. In 1912 he was elected to the Senate, where he has taken rank among the ablest men and most independent thinkers of the body.

In 1894 Mr. Strother was married to Miss Mary Taylor, daughter of Major T. S. Taylor, a gallant veteran of the Confederacy. Two children have been born to the union, Mary James, June 10, 1900, and James A., Jr., March 8, 1905.

Senator Strother is a thirty-second degree Mason, a Knight Templar, and a member of the Benevolent Protective Order Elks. He is connected with the Episcopal Church.

During the regular and special sessions of the West Virginia Legislature of the present year, the chairman of the Finance Committee of the Senate, and leader of the administration forces on the floor of that body was Hon. Wells Goodykoontz, of Mingo county. Mr. Goodykoontz was born near Pulaski, Virginia, on June 3, 1873, the son of William M. and Lucy K. (Woolwine) Goodykoontz. He received his education in the public schools and at Oxford Academy, and studied law at Washington and Lee University. Admitted to the bar soon after he reached the age of twenty-one, he settled in Williamson, West Virginia, and began the practice of his profession. He has been eminently successful at the bar, having been employed in many important cases which have taken him into the highest courts of the State and nation. He has shown fine capa-



city also as a business man, and has been president since its foundation of the National Bank of Commerce of Williamson. In 1910 he was elected to the legislature, and was known in that body as one of the strongest of its members. In 1914 he was elected to the State Senate, of which he is a member at present.

Senator Goodykoontz is a Mason of high degree, being a member of the Shrine. He is a Presbyterian in his religious affiliations, and a trustee of the Presbyterian Academy at Williamson.

Mr. Goodykoontz was married on December 22, 1898, to Miss Irene Hooper, of New Orleans, and they have a beautiful home on Reservation Hill, the choice residence section of Williamson.



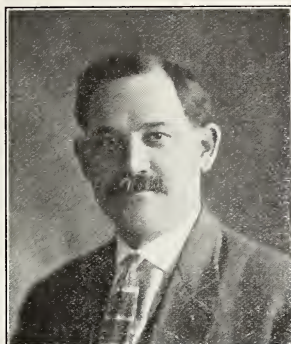
HON GEORGE E. WHITE

Senator from Lewis.

George Ervan White, son of Clark White and Kathryn Elizabeth (Rohrbough) White, was born in Lewis county on November 3, 1884. He was educated at the local public schools, at Broadus Institute, the University of Virginia and West Virginia University. After leaving school he entered the practice of the law, to which he has since devoted most of his time. Later he became interested in the production of oil and gas, in farming, in banking and in a number of industrial enterprises. In 1912, at the age of 27, he was elected to the State Senate, where he made a brilliant record, and in 1914 was nominated for congress in his district. He made a strong campaign, and was defeated by only 452 votes in a total of 50,000. Backed by the younger element of the Republican party, it is more than probable that Senator White will be a candidate for congress in the new Third district in the election of 1916. During the sessions of the legislature of 1915 Senator White was chairman of the Senate Committee on the Judiciary, and was instrumental in securing the passage of some of the most important acts written upon the statute books of the State at those sessions. He was the author and patron of the State-wide primary law enacted at the regular session. Recently Senator White took editorial control of the Weston Republican, one of the most influential papers in Central West Virginia, and already his ability as a writer has become recognized throughout the State.

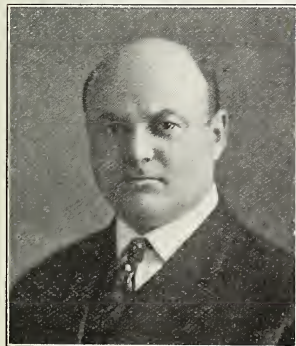
HON. BENJ. L. ROSENBLIOM
Senator from Ohio.

Benjamin L. Rosenbloom, Senator from Ohio county, was born in Brad-dock, Pennsylvania, on June 3, 1880, the son of Morris and Fannie Rosenbloom. He attended the common schools until 1894, and then the Brad-dock High School until 1897, when he matriculated in the Western University of Pennsylvania. In 1900 he left the University and worked in Edgar Thompson's Steel Works until 1902, when he entered the law school of the West Virginia University, at Morgantown, took the State Board examinations in law and was admitted to the bar. He returned to Pittsburg and took a position with D. F. Collingwood, Treasurer of Allegheny county, for the term of his office, which expired in 1907, and then removed to



HON. W. P. HAWLEY
Senator from Mercer.

W. P. Hawley, of Bluefield, was born in Raleigh county July 22, 1868. He attended the county schools and graduated at the Concord Normal in 1889. He organized and is now president of the Hawley Merchandise Company, and secretary, treasurer and general manager of the Bluefield Telephone Company. He represented his county in the Legislature for two sessions. In 1912 was elected to the Senate, of which body he is a useful and influential member.



Wheeling where he engaged in the practice of the law. He has been industrious and devoted in his profession, the consequence being that he has built up a very considerable practice. He is a member of the American, the State, and the Ohio County Bar Associations. He is a member of the Elks, Odd Fellows, Knights of Pythias, I. O. B. D. and A. O. U. W., and a member also of Eoff Street Temple. He was never a candidate for office until 1914, when he was elected to the State Senate, in which body, during the sessions of 1915, he occupied a very prominent place. He is unmarried and makes his home at the University Club in Wheeling, an organization which he helped to form, and which he serves as vice-president. He takes a deep interest in athletics and while a student played on the football teams of the schools he attended, as well as on that of the famous Pittsburg Athletic Club.



C. D. CONOWAY.

C. D. Conoway, Sheriff of Marion county, was born near Fairmont August 3, 1864. During his term of less than three years he has had to deal with murderers, rioters, the black hand and other desperate characters, 85 of whom have been sent to the penitentiary, 8 for life.

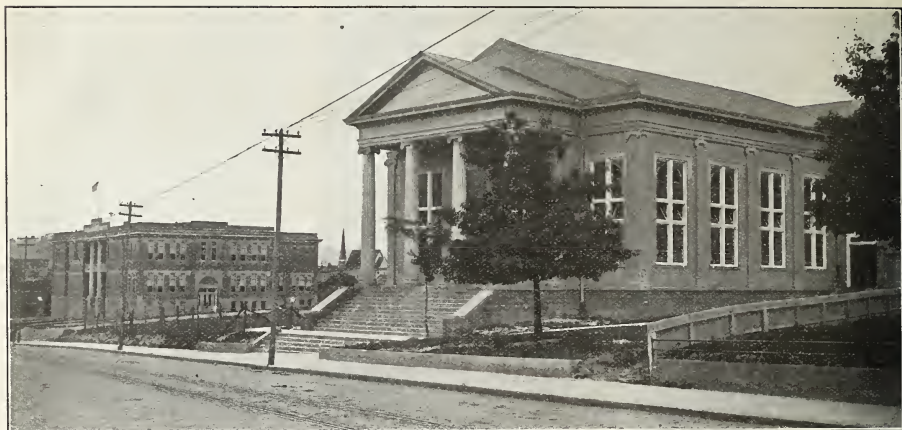
HON. M. V. GODBEY
Senator from Kanawha.

Martin Van Buren Godbey, M. D., present member of the West Virginia Senate from the district composed of Boone, Logan and Kanawha counties, was born in Raleigh county on December 19, 1879, and educated in the public schools and at Marshall College. The means for attending the latter school he obtained by teaching, a work he began at the age of fifteen, and in which he had remarkable success. After three years at Marshall College he pursued his academic studies for two years further at Grant University, Chattanooga, Tennessee. Upon the completion of his preparatory course he entered the Baltimore Medical College, from which institution he was graduated with the class of 1905, with the degree of Doctor of Medicine. He immediately began the



practice in Boone county, West Virginia, and pursued it with growing success until 1909, when he removed to Charleston to take advantage of the wider field there offered. In 1906 the Republicans of Boone county nominated him as a candidate for the legislature, to which body he was elected, being the first Republican sent from Boone county since 1863. In the session of 1907 he was chairman of the House Committee on Medicine and Sanitation, and a member of other important committees. In 1909 Governor Glasscock appointed him a member of the State Board of Health, and in 1910 he was made secretary of the Board of Examining Surgeons. In 1914 he was elected to the State Senate, and in the regular and special sessions of 1915 was a prominent and useful member of that body.

The City of Princeton.



EAST RIVER DISTRICT HIGH SCHOOL.

FIRST BAPTIST CHURCH.

The city of Princeton, seat of justice of Mercer county, lies near the eastern border of West Virginia at an altitude of 2,500 feet above sea level. Its location is ideal, being situated in a wide mountain valley of several miles area, with many surrounding points that furnish magnificent views. Its summer climate is delightful, and must in future attract a great deal of attention to the city as a summer resort. Though settled many years ago, Princeton showed little growth until within the last decade, when the coming of the Virginian Railway, bringing it into close touch with the outside world, gave it an impulse of growth that carried it from a village of 500 to a city of 6,000 or 7,000 population. Not only has it enjoyed a remarkable growth in population, but it has rapidly increased also in respect of those public improvements that go to make a city.

It has well paved streets in the business section, with more than eight miles of first class concrete sidewalks; an adequate sewer system and an excellent water supply, sufficient in size and equipment to serve it for a good many years. It is well lighted by electricity, from a plant of sufficient capacity to furnish current for many other purposes besides, and an electric street car line gives good service to the principal sections within the municipal boundaries.

The public buildings of Princeton compare favorably with those of many towns much older and with greater population. There are two large, well built and thoroughly equipped public school buildings. One of these, the East River District High School, pictured above, is centrally located and arranged for the accommodation of 1,000 pupils. The city has six magnificent church edifices, the cost of at least two of them being more than \$30,000 each. There are four hotels, two of which are equipped with all modern conveniences and accessories. For a city of its youth Princeton has an unusually large

number of beautiful homes, of delightful architectural design.

The chief industries of Princeton are the big shops of the Virginian Railway, which employ five hundred to six hundred men; three plants engaged in the manufacture of lumber, a handle factory and a flouring mill. The railway yards also give employment to a number of men, and the train crews making headquarters there add considerably to the prosperity of the mercantile and general business institutions of the city.

The prospects for future growth at Princeton are particularly bright, being based upon advantages of more than usual merit. The county of Mercer has a large area of excellent farming land, and holds an important place among the counties of the State in the production of corn, oats, wheat and hay. It lies within the blue grass district, and presents attractive opportunities to graziers and stock growers that must in the near future cause a very considerable increase in those pursuits. It is also an excellent fruit growing section, and orcharding is coming more and more into popularity as a distinct line of husbandry. By recent bond issues \$800,000 has been raised to be spent upon a system of macadamized roads radiating from Princeton throughout all sections of the county, and making it the center of trade for the rural population. The Princeton Power Company is building an interurban electric line between Princeton and Bluefield, twelve miles way, thus connecting the two largest towns in the southeastern portion of the State, to the great advantage of both. The output of coal on the Virginian Railway is continually and rapidly increasing, and the number of employes of the repair shops at Princeton is being steadily increased to meet the demand made by increased equipment.

All in all, Princeton is one of the most beautifully located towns in West Virginia, with a delightful climate, excellent business facilities, and an assured future, of rapid growth and great prosperity.

The Virginian Power Co.

Steam Power Plant Located at Cabin Creek
Junction on the Chesapeake & Ohio Railway.

Present Capacity 20,000 K. V. A. --- Ultimate
Capacity 60,000 K. V. A.

200 Miles 44,000-Volt Transmission Lines, Steel
Towers. 50 Miles 2,300-Volt Transmission Lines.

Substation Capacity 30,000 K. V. A. --- Number
of Substations 54.

Serves 120 Coal Mines in the Kanawha and
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Lights the Towns of Beckley, Macdonald, Mt.
Hope, Oak Hill, Fayetteville, Thurmond and
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Serves Entire System of Charleston Interurban
Railroad Company.

Present Transmission System in the Counties
of Kanawha, Boone, Fayette, Raleigh and
Wyoming, and is continually being
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West Virginia Raises Many Export Cattle that Bring Top Prices in the Foreign Markets.

Stock Fattens on the Bluegrass and goes directly to market without being grain fed.

West Virginia has the record of having produced the Best Wool in the World.

According to the New York Market Reports one Ranch in West Virginia sent the Best Carload of Lambs seen in the Jersey City Market for Three Successive Seasons.

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